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ENVIRONMENTAL ECONOMICS RESEARCH COMMITTEE

Theme: Water Institutions and Sustainable Use
EERC Working Paper Series: WIS-7

Participatory Approaches And Environmental And Economic Impact: With Special Reference To Integrated Watershed Development Project (IWDP), Hills-II, Jammu And Kashmir, India

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ENVIRONMENATAL ECONOMICS RESEARCH COMMITTEE

Under

THE WORLD BANK AIDED

“INDIA: ENVIRONMENTAL MANAGEMENT CAPACITY BUILDING TECHNICAL ASSISTANCE PROJECT”

MINISTRY OF ENVIRONMENT AND FORESTS (MOEF)

Indira Gandhi Institute of Development Research

Goregaon (East), Mumbai - 400065 (India)

ACKNOWLEDGEMENT

This research project would simply have not occurred and we should not have built up this huge list of creditors if we had not received a very substantial and flexible research grant from Ministry of Environment and Forests (MOEF) and World Bank Aided “India: Environmental Management Capacity Building Technical Assistance Project” (EMCaB), managed by Environmental Economics Research Committee, (EERC) at Indira Gandhi Institute of Development Research, (IGIDR) Mumbai. So we begin by gratefully acknowledging their support.

Next in the list of creditors must surely be the villagers who in some way have been the “subjects” of this research, and have cooperated whole-heartedly and completely selflessly with our incessant visits, questions, demand for information and data, and so on. We would like to thank all the respondents of the selected sub-watersheds.

We express our immense sense of indebtedness to Project Chief, IWDP (Hills-II), Jammu and Kashmir for his constant encouragement, valuable guidance and morale boosting suggestions, during the course of this study. We, sincerely, acknowledge the critical observation of the Deputy Director, IWDP (Hills-II), Jammu and Kashmir, and Chief Executive Officers of the selected sub-watersheds of Ramnagar and Akhnoor.

We feel fortunate to receive the constructive criticisms and inspiring suggestions from Dr. Jyoti Parikh, Chairperson, EERC; the EERC members, especially Dr. Paul Appasamy, Dr. Kirit Parikh, Dr. Sudarshan Iyengar, Dr. Robin Mukherjee, Shri K. K. Narang, Special Advisor to Ministry of Environment and Forests, Government of India, New Delhi and Prof. R. S Despande, Institute for Social and Economic Change, Bangalore. The constant help and encouragement provided by Dr. Raghu Ram Tata, Coordinator, and Ms. Ramamurty, Financial Consultant, EMCaB Project was instrumental in making the project happen; we are very grateful to them.

We would like to thank Prof. A. N. Sadhu, Prof. O. P. Sharma, and Prof. R. L. Bhat, and Dr. Prakash C. Anthal of Post-Graduate Department of Economics, University of Jammu, Jammu for their continued and very generous moral support at all times.

We also wish to thank Sh. Zakar Hussain and Sh, Gurvinder Singh, Research Assistants who worked on this research project and provided crucial inputs in data collection and tabulation, etc.

Lastly, we are thankful to Dr. J. S. Dev, Registrar and Sh. J. K. Sharma, Deputy Registrar, University of Jammu, Jammu, for administrative support in all matters.

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May 8, 2003

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CHAPTER - I

Introduction

In the recent past, experiences have been gained on participatory approaches in irrigated agriculture, community and social forestry, horticultural development, fisheries development, rural development etc, and have influenced the development policies even though they may not have yet reached the implementation and operational level. However, not many experiences have been available or documented, which deal with participatory approaches to multi-sectoral, multi-objective programmes such as integrated watershed management, particularly in mountainous and rainfed areas. This is because; they are very complex programmes often dealing with conflicting objectives e.g. development and environment, maximization of economic benefits and conservation of resources, market economy and self-help/food security. However, attempts are being made to facilitate the participatory process in this area also [Sharma, (1995)]. Participatory policies are highly relevant and are consistent with India's overall development strategy of reducing poverty, protecting environment, developing human resources, and fostering farm sector growth. However, a period of only a few years is not sufficient to judge whether the stated physical, financial, institutional or policy-related goals have been met or are likely to be met and their successful implementation should draw strength from documentation and knowledge about grass roots experience. The experience so far shows that unless the process through which participation is to be secured is described in detail and monitored, it is likely to be ignored - both because of a lack of commitment among the government staff, and a lack of knowledge about the road map to destination [Saxena (1999)]. Just as any area development programme is designed for the people of the region and its success counts on the participation of the people in the programme. The environmental and economic issues are highly complicated in the watershed areas with majority of the people making a hand to mouth existence. The environmental and economic benefits accrued from watershed management can be enhanced only

when the people are ensured and equipped adequately to make a socially acceptable living. Nevertheless, the achievement of these rests on the participation of the people at different stages of the programme.

Background of IWDP (Hills-II), Jammu and Kashmir

Numerous schemes for development of land resources are in operation in India. Some are watershed based while others are based on administrative boundaries. The objective of all the schemes is to put emphasis on management of soil and land resources for sustainable crop production and protection of environment [Sadhu and Sudan (1999)]. In the last decade, in order to prevent and reverse the degradation process of the *Shivaliks* and *Karewas***,** Integrated Watershed Development Project (IWDP), Hills-I was undertaken. Originally, the project was for a period of 7 years (1990-97), but was extended for another year up to 1998. The project was supported by the World Bank and was implemented in the four states: Jammu and Kashmir, Himachal Pradesh, Punjab and Haryana [World Bank (1999)]. In the state of Jammu and Kashmir, IWDP (Hills-I) was initiated in three sub-watersheds of Devak and Ramkote in *Shivalik* hills (Jammu region) and Dudh Ganga in *Karewas* (Kashmir Valley). The overwhelming evidence from natural resource management projects is that without people's involvement the benefits are not sustainable in the long run. After the funds from the government or donors dry up, conservation structures disappear, committees are disbanded or abandoned and the livelihood base of the people remains only marginally improved at all [Saxena (1999)]. Fortunately, these shortcomings were taken care of, to some extent during the implementation of IWDP (Hills-I) [Sadhu and Sudan (1999)]. IWDP (Hills-I) was implemented for soil and water conservation in the watershed areas aiming at proper land use according to land potential, protection of land against all kinds of deterioration, building and maintaining soil fertility, conserving water, proper management of water for drainage, flood protection, sediment reduction and increasing productivity from all kinds of land uses. Besides, improved vegetative coverage of treated areas, increased community participation and formulation of engaged village users' group,

increased crop yields and increased household incomes of marginal and small farmers, the landless and the women were included as major objectives of IWDP (Hills-I) [World Bank (1998)].

IWDP (Hills-I) has made only a modest impact and it can't be denied that as it has been the first phase of this experiment, some shortcomings were bound to remain, but, at the same time, it must have enriched the experience of the project functionaries which should equip them to carry out their role more efficiently in second phase [Sadhu and Sudan (1999)]. The principal lessons learnt from IWDP (Hills-I) were:

(i) The need to develop an integrated approach to the *Shivalik* Watersheds,

(ii) The need for a coordinated approach to the use of available funds from all sources,

(iii) The need to involve stakeholders in planning, implementation and maintenance,

(iv) The need to increase stakeholder awareness of environmental and socio-economic considerations in articulating communities' needs,

(v) The need to focus on measures to arrest soil erosion and promote *in-situ* moisture conservation from ridge to valley,

(vi) The need to assess marketing prospects, especially of horticultural products,

(vii) The need to improve infrastructure within watersheds, particularly rural links to markets, water harvesting and drinking water,

(viii) The need to develop monitorable project implementation and development objectives' indicators, and

(ix) The need to involve local NGOs in the project as facilitators and trainers in the planning and implementation of the project [World Bank (1998)].

Seeing the physical targets being achieved by the participating states, the World Bank decided to further extend the programme in the form of IWDP (Hills-II) not only in other areas of states selected in phase-I, but also including the state of

Uttar Pradesh, in 1999, for five years. This was aimed at providing a uniform integrated rural development platform to address the social and natural resources problems of the entire *Shivaliks* in India [World Bank (1999)]. The experience gained through implementation of IWDP (Hills-I), J&K encouraged the State Government to extend the watershed development project to other rainfed areas of the State viz. Akhnoor and Ramnagar in *Shivaliks* (Jammu region) and Rajwar and Rambiyara in *Karewas* (Kashmir Valley). The main objective of the IWDP (Hills-II) is to restore the productive potential of the *Shivaliks* and *Karewas.* This would be attained by using evolving watershed development and community participation approaches. The focus is on improving *in-situ* moisture conservation, water harvesting and land management practices. An associated objective of the project is to assist with the institutional development and consolidate the progress already made under IWDP (Hills-I). Although the main objective remains to be the restoration of the productive potential of the hills in five participating states, the priority plans of different states differ. Following are the objectives of IWDP (Hills-II), Jammu and Kashmir:

(i) to restore on a sustainable basis the productive potential of the region and improving the quality of life,

(ii) to reduce soil erosion and improve availability of water,

(iii) to help increase production and income, grain crops, horticulture, fodder, fibre, fuelwood, livestock and household based products,

(iv) to promote holistic and sustainable agro-ecological development involving people's participation,

(v) to strengthen community participation, and

(vi) to develop local level institutions to enhance the sustainability of the model [World Bank (1999)].

Problem Statement

Integrated watershed management is the process of formulating and implementing a course of action involving natural and human resources in a watershed, taking into account the social, political, economic and institutional

factors, operating within the watershed and the surrounding river basin and other relevant regions to achieve special social objectives. Typically, this process would include: (i) establishing watershed-management objectives; (ii) formulating and evaluating alternative resource management actions involving various implementation tools and institutional arrangements; (iii) choosing and implementing a preferred course of action; and (iv) thorough monitoring of activities and outcomes, evaluating performance in terms of degrees of achievement of the specified objectives [Easter, Dixon and Hufschmidt (1986)]. Watershed-management practices are those changes in land use, vegetative cover, and other non-structural and structural actions that are taken in a watershed to achieve watershed-management objectives [Pereira (1989)]. The watershed approach is the application of integrated watershed management in the planning and implementation of resource management and rural development projects or as part of planning for specific resource sectors such as agricultural, forestry, or mining. Imbedded in this approach is the linkage between uplands and lowlands in both biophysical and socio-economic contexts.

Watershed management in India has been defined as a rational utilization of land and water resources for optimum and sustained production with minimum hazards to natural resources. Increased public participation of individuals and groups in the design and implementation of projects would increase the returns-both environmental and economic. The *World Development Report* (1992) stresses the importance of participation in creating effective programmes and viable resource-management institutions. An FAO Conservation Guide [Bochet, (1983)] focuses on the role of mountain communities in the design and implementation of watershed management programmes in upland areas. National Policy on Watershed Development had recently been characterized by a concern that decisions on rehabilitation and subsequent rights and responsibilities should be taken in ways, which support the livelihood of poorer groups, and are institutionally sustainable. The Guidelines on Watershed Development [Government of India (1994)] marked a significant step towards approaches that are participatory and involve a high degree of decentralized

decision taking and allocation of funding. People's participation in watershed management reduces the cost of project interventions, increases the benefits to people participating in the programme, correct the mistakes made by the project functionaries in designing various structures, increase the level of political awareness of the people, decrease the perpetual dependence of the people on government and thereby making the programme self sustaining. Mobilisation of local resources and project implementation becomes easier and smooth as a result of participation of local people [Singhal (1999)].

Institutionally sustainable rehabilitation and management of watershed development project is possible only where stakeholders/beneficiaries act jointly to manage the resources. Watershed development is essentially a resource-base approach to environmental protection and livelihood enhancement. Unless adequate safeguards can be built in, the danger is that, as the commons become more productive, better-off farmers are tempted to take control of them and customary access rights of the poor are denied [Farrington et al. (1999)]. Watershed development project is being affected by three broad groups of factors: How the project is designed and implemented, how the project is organized and what external agencies are operating at watershed level. Community awareness, knowledge, support and public participation in the decisions that affect the environment and economic outcomes are equally important. This is, best secured by creating centralized systems of regulation, use and management of resources upon which local communities depend and giving these communities an effective control over the use of these resources [WCED (1987)]. To the extent over exploitation of natural resources is due to lack of inappropriate structure of property rights, creating and enforcing appropriate property rights in common property resources could be an instrument of averting their tragedy and improving the environmental and economic gains [Singh (1997)]. India's experience with various watershed development projects shows that the participatory approach could ensure sustainable use of renewable common pool natural resources [Singh (1995)]. Thus, the present study is of contemporary relevance and examines the participatory processes adopted at

watershed level, the transaction costs involved and their influence on environmental and economic outcomes from various project interventions under IWDP (HILLS-II), Jammu and Kashmir.

Literature Review

I. Institutions and Resource Management

The weak community's intervention and erosion of grassroots mechanisms to protect and enhance rural community's stakes constitute the vital reason behind environmental resource degradation irrespective of economic status of the communities. The institutional approach in natural resource management is largely ignored in watershed areas, which apparently explain the link between environmental resource degradation and rural poverty [Jodha (1986)]. During the recent past, some kinds of changes in institutional structure are seen to be playing a useful role. Small communities, often with non-government and/or government support are seen to come together with the express intention of preserving the environmental resources linked with consumption patterns and livelihoods [Blomquist (1992), Wade (1988), Tang (1992), and Uphoff, (1993)]. Such change in the institutional framework amount to an alternation in the nature of property rights. The newly emergent institutions lay down the nature of user rights and obligations. They aim at laying down a codified set of rules, which by convention or law mediates the nature of the relationship between resources and people. One of the outcomes of such new organizational form is an increase in the capacity of the environment to improve rural livelihoods.

A local level "institution creating" focus begins with examination of rights to access, use and ownership of resources by individuals, households and other social groups. It confronts the existing set of social norms and practices and questions whether they are appropriate in the context of efficient and sustainable resource management. If the need for new boundaries of access, or norms of behaviour arises, the micro-initiative had to put these in place and the following steps may be necessary in this process: (i) Consensus building with respect to the need for a new dispension, (ii) The setting out of detailed rules for working

together on specific asset or income creation activities need to be worked out, (iii) The putting in place of a system of responsibility for repair and maintenance of assets created, (iv) The sharing of output, its time and the manner in which it accrues need to be spelt out as well, (v) The putting in place of a mechanism for changes in rules and norms of behaviour [Bromley (1989), Kolavalli (1997), Quiggin (1993), and Chopra and Kadekodi (1998)]. The local issues led intervention is more flexible in the initial stages. It draw its strength from this ability to improvise rules and conventions of behaviour and to build on traditional institutions to set up innovative models of management, in particular in the context of natural resources. However, expansion may bring it in conflict with other institutions that pervade the economy at the macro level. Examples are legal bottlenecks and/or market generated constraints. There is greater need for decentralization and state involvement to ensure that the seat of local decision-making is not usurped by the politically and economically powerful [Dasgupta (1997)].

II. Participation and Watershed Management

Participatory management has been defined as a process whereby those with legitimate interests in a project both influences decisions, which affect them and receive a proportion of any benefits, which may accrue [ODA (1996)]. It is now widely accepted that to enhance and sustain the productivity of natural resources, those engaged in and affected by managing the resource at the most basic level, its users-must participate in planning its rehabilitation and management. Their participation will generate a stake in the process and enhance the prospects of both institutional and ecological sustainability. A participatory approach, therefore, implies a major, but not exclusive, role for local populations in allocating rights and responsibilities over resources. It may involve partnerships with other interest groups at micro and macro level, such as district line-agencies, local political bodies, ministries of finance, and policy-makers. A key concern for micro-watershed development is to identify approaches, which ensure that the interface between rural people, local organizations and the state

is managed in a way which is most likely to enhance efficiency, effectiveness and accountability [Carney and Farrington (1998)].

For successful implementation of a development project, people's participation is a must. It has been observed that no amount of skill, labour and investment can make such developmental projects a success unless people participate. The developmental work in the project needs to be appreciated and accepted by the inhabitants so that their willing participation is obtained; rather than they should contribute in kind, money and labour in execution of works. In a way, such projects for their success should become a people's movement [Sur (1996)]. People's participation in watershed planning and implementation is as vital as the scientific input in designing; one purpose is the strong linkage between private property resources, common property resources - quality of life and optimum social benefits. There are many examples, which have clearly shown the results of a community-planned watershed [Mittal et al. (1986); Deshpande and Reddy (1990); Kumar (1990); Arya and Mittal (1992). The success of these projects lied in the involvement of the local people in managing the land, forest, animals and water resources. World Commission on Environment and Development (WCED) has emphasized that "environmental and economic problems are linked to many social and political factors…….. It could be argued that the distribution of power and influence within society lies at the heart of most environment and development challenges. Hence, new approaches must involve…….local participation in decision making" [WCED (1987)].

The substance of participation is, however, often ill defined, and clarification is needed regarding who is participating, how, and in what. Despite the "feel-good" factor associated with participation, it must be recognized that it is not a neutral concept, and involves a set of political issues concerning who has decision-making power and who has access to resources. While the participatory watershed development is appealing to donors, operationalizing and executing such projects with field practitioners are proving to be for more difficult than realized. Some sympathetic observers with field experience hint that the participatory approach has not delivered the goods and should be reevaluated. Fisher (1995) even

suggests doing away with the term “participation” since “token use of the terminology (participation) has devalued it; participation has to come to mean so many things to different people that it means nothing”. Since the rationale for funding participatory approaches is to redress the sins of the top-down, heavy subsidy approaches of the past, which have alienated local population and even contributed to further land and water degradation, the burden of proof has been - perhaps unrealistically - placed on the new “participatory” approach. Unfortunately, the latest boom in participatory watershed projects is fairly recent and the first assessments are only now starting to be made available. Most evidence of success or failure at this point is almost entirely anecdotal, if the participatory approach is the answer, then its proponents in a few years will have to prove beyond mere rhetoric that it actually works. One project, “the New Horizons Project” reviewed 22 participatory watershed development projects and concluded that participation is superior to top-down, coercive projects, but unfortunately the impact measurement are vague and based on the agencies own funding instead of independent evaluation by external reviewers [Farrington and Lobo (1997)].

Since the late 1970s, there has been a major thrust in getting scientists and planners in agriculture and natural resource management to accept and institutionalize the concept of participation [Rhoades and Booth (1982)]. As late as 1990s, however, it was still problematic for most agricultural scientists to accept that farmers could have an active role in technology design. Farmers were seen as recipients of science and technology, not as partners in the process. Irrespective to their relative lack of resources, small farmers are the ultimate managers and day-to-day decision-makers about what happens to their lands, within the on-farm and off-farm constraints and potentials that surround then [Shaxson et al. (1989)]. If they feel that they have been sidelined from decision-making about what is going in a particular situation - or have not even been consulted at all - they are unlikely to be very enthusiastic about what is proposed by others. In reality, people always prefer to satisfy their individual needs first, followed by taking care of watershed resources. The sense of community action grows gradually in solving the problems within the village and

then over the period of time, it cuts across the village boundary [Kar and Sharma (1996)].

Reardon and Vosti (1992) argued that both productivity and conservation investments are needed, as one does not always promote the other. Productivity investments might undermine long-term sustainability. Household decision process plays an important role in choosing cropping pattern and conservation investments. Since investments in such ventures as horticulture, forestry, soil and water structure are long term in nature, there is little incentive for farmers to undertake them. As these practices need to be implemented on non-arable public lands in addition to private lands, the initiative for them should come from the government. Once the necessary funds are available, the coordination among different departments is required. Apart from coordination and implementation by different government agencies, the people's participation and cooperation is vital for the success of watershed programme.

Mitchell (1997) identified key elements for successful participation and partnerships. Some key elements are as follows: compatibility between participation; benefits to all partners; equitable representation and power for participants; communication mechanism; adaptability; and integrity, patience and perseverance by partners. These elements are not essential for successful partnerships, but the more that are present, the greater is the likelihood that a partnership will endure and be effective. The degree or amount of public involvement, which is desirable and feasible, must be determined. Arnstein (1969) observed that a participatory approach could represent a redistribution of powers from managers to the public. On that basis, she argued that different degree of involvement could be identified, ranging from non-participation, to tokenism, to actual sharing of power.

Ontario Ministry of Natural Resources (1995) has identified various degrees of participation by four types of strategic alliances with potential partners. These are: (i) Contributing partnerships in which a public or private organization has agreed to provide sponsorship or support, normally through actual funding, for some activities in which it will have little or no direct operational participation.

While the financial contribution is often essential for the success of the activity, this type of arrangement is a weak type of partnership, since not all partner are actively involved in decision making; (ii) Operational partnership have partners sharing work rather than decision-making power. The emphasis here is upon reaching agreement on mutually desirable or compatible goals, and then working jointly to achieve them; (iii) Consultative partnerships are those in which the resource management agencies actively seeks advice from individual, groups and other organizations outside government. The mechanism is usually a committee or council, which is primarily designed to provide advice to the public agency about a specified policy issue; and (iv) Real decision-making power is shared in collaborative partnerships. The intent is to achieve mutually compatible objectives and the resources to be shared may involve information, labour or money.

Pimbert and Pretty (1997) provide a useful summary of main forms of participation. These are (i) Passive participation: people participate by being told what is going to happen or has already happened, (ii) Participation in information giving: people participate by giving answers to questions posed by extractive researchers and project managers, (iii) Participation by consultation: people participate by being consulted and external agencies listen to their views, and define both problems and solutions, (iv) Participation for material resources: people participate by providing resources, for example, labour in return for cash or food, (v) Functional participation : people participate by forming groups to meet predetermined objectives relating to the project, which can involve the development or promotion of externally initiated social organisation, (vi) Interactive participation : people participate in joint analysis, which leads to joint action plans and formation of new groups or strengthening of old ones; and (vii) Self-mobilisation : people participate by taking initiatives independent of external change systems.

Sharma (1995) reviewed participatory approaches adopted in a complex efforts like integrated watershed management and identified the following approaches which varies from indigenous efforts which have been a way of life of the people

since ancient time on which a society was structured, traditional efforts which are based on culture and mores of the people, and facilitated efforts which are helped by various means by development agents. Sharma (1995) also identified participatory process, which includes a combination of these approaches. Indigenous and traditional approaches pave the way for long-term efforts and commitment e.g. for maintenance of infrastructure, protection and judicious use of land, water and forest resources for meeting continued demands of the people. Co-opted participation is initiated through development aid, incentives, payments and top-down policy instruments, etc. is temporary and in fact results into a negative reaction resulting in non-participation of the people on a long-term basis. The coerced or forced participation is definitely very temporary and can create complete inhibition of the creative powers of the people, which can easily, result into rebellion. Sharma (1995) further identified key elements in the approaches to the participatory process which include correct identification of the problems and their solution, envisioning or call for a higher (cosmic) human dimension, ownership of watershed management programmes, farmer's organization building and their empowerment, land titling/tenure/allocation, benefit generation, and gender concerns.

NGO approaches have traditionally focused at the mobilization end of the spectrum, concentrating on strengthening rural people's capacity to articulate their requirements, form groups, plan for and undertake joint action, and so on. However, a route, which insists on long-term, face-to-face, empowering approaches in individual villages, may achieve institutional sustainability at the cost of very slow spread [Farrington and Boyd (1997)]. This approach contrasts with that of some governments and donors, in which large amounts of funding are provided and area-wide adoption is an explicit programme objective. Participation has been limited to the provision of labour at worst, and information giving or consultation at best. Consequently such projects have performed poorly with respect to long-term sustainability [Jain (1995)]. The future of most of the projects becomes uncertain when the funds are withdrawn after the prescribed period. In such cases, there is no continuous flow of benefits to the beneficiaries.

Most of the projects vanish when the funds and personnel are withdrawn. If development is a one-time activity, the question of continuity of efforts or sustainability does not arise. But is not so. Hence, it is necessary to think of the means of generating self-sustaining efforts so that the projects once initiated would go along and produce continuous benefits [Santhanam (1995)].

The approach paper to the Ninth Plan points out “the Eighth Plan had identified people’s initiative and participation as a key element in the process of development, particularly in improving effectiveness of development outlays which has been declining over the years. It had also recognised that the role of the Government should be to facilitate the process of people’s involvement by creating the right types of institutional infrastructure, particularly in rural areas. The process of social mobilisation and development of people’s initiative cannot be achieved without the active support and involvement of the political system at all levels. In the Ninth Plan, the *Panchayti Raj* bodies in rural areas and municipalities in urban areas will be directly involved in the development process. People’s involvement through their elected representatives will be realised through a genuine democratic decentralization”. The approach paper continues to stress that “other forms of people’s participation also need to be strengthened. The government will seek an active partnership with the voluntary sector in organizing and promoting these institutions [Government of India (1997)].

Cohen and Uphoff (1980) list four types of participation, viz., in decision-making, implementation, benefit distribution and evaluation. This appears to be an operational classification. Nevertheless, the symmetry of participation in all these aspects can bring about expected outcome in an *in situ* development programme. In the case of watershed programme, an *in situ* development programme, the participation of local people is *sine quo non,* since the different activities implemented on private lands and public land in addition to maintaining collectively the works undertaken in common lands. This seems to emphasize the significance of participation for sustainability. Better participation can be ensured at the later stages of the programme only by identifying and designing the programme, which is acceptable to the people and is environmentally benign.

Involving a large number of people in training and designing the implementation process also staves off the formation of factions among the beneficiaries and recommends that organizing the local resource users for the construction of water harvesting structure and empowering them to decide the treatment and priorities can decidedly buoy them up for sincere implementation.

Ostiani and Warren (1995) attempt to extract the initial methodological and technical lessons being learned from the field experience of the *Inter-regional Project for Participatory Upland Conservation and Development.* These are: information needs for participatory and integrated watershed management, from exploratory open-ended participatory appraisal to thematic participatory environmental assessment, participatory planning as a negotiation process, participatory feasibility analysis, participatory monitoring and evaluation as elements of a capacity-building strategy, steps towards community self-organisation in natural resource management, women capacity-building and increased role in decision-making as preconditions of their participation in improving natural resource management, towards a participatory watershed management plan, motivating and financing supporting local actors in natural resource management, development of local expertise in participatory watershed management through continuing education and formative monitoring and evaluation, promoting the valorization of human resources trained and experienced in participatory and integrated natural resource management, putting together the expertise needed to implement participatory watershed management plans and conditions for institutional sustainability of participatory watershed management initiatives.

Olson (1965) postulated that “unless the number of individuals in a group is quite small, or unless there is coercion or some other device to make individual’s act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests.” In the case of watershed management, the sum of individual decisions affects the welfare of the group as a whole [Anderson and Runge (1994)]. It is possible through some type of coordination norms and the degree of group homogeneity reinforces reciprocal behaviour and sub-

optimization in the short-run. This in turn ensure Pareto optimal situation in the long run. Participation is the introduction of a new set of people into the decision-making process with regard to resource allocation or resource distribution [Richardson (1983)]. People's participation is an active process by which beneficiary/client groups influence the direction and execution of a development activity with a view to enhancing their well being in terms of income, personal growth, self-reliance, or other values they cherish. In view of the complementary nature of the relationship between development and preservation (of common property resources), people's participation should involve the management of common property resources as well [Paul (1989)]. But participation is not just an end in itself; rather it is a means in the case of watershed [Cohen and Uphoff (1980)].

III. Institutions and Bio-physical and Economic Aspects

As watershed issues involve long-term benefits and trans-boundary problems, the success of watershed development programmes depend on factors influencing the adoption of soil conservation practices [Anderson and Thampapillai (1990); White (1992)]. Factors influencing the adoption of soil conservation are type of the technologies, knowledge of the farmers and policy incentives. Farmer's knowledge about various technical and economic relationships is crucial for adoption of conservation practices. Further, as the benefits are not immediate and only specific to site, their cooperation is extremely important. Therefore, apart from the physical linkages of soil, water and biomass, the socio-economic and political conditions play an important role in the success of watershed programmes.

Besides physical linkages, issues relating to land tenure, economic and social institutions and culture of watershed inhabitants become crucial in designing watershed projects. Brooks et al. (1990) state that though physical linkages cannot be excluded "the practical means of achieving sustainable projects in watershed management, conversely, can not ignore land tenure, institutions and the culture of watershed inhabitants". Blackie (1983 and 1985) has also

emphasized the importance of social factors such as institutions, political and economic. He argues that the politics of the state and society (agrarian relations) are central to soil conservation. An understanding of how and how far the state will implement soil conservation policies require a careful analysis of whose interests are represented in the various institutions involved. Secondly, the analysis of the politics of agrarian society is another essential ingredient into a realistic appraisal of what is possible and what is not. White (1992) also argues that watershed should be considered as sets of vested interests (and social relations). Actors with vested interests within watershed are inter-dependent because water-flows across private as well as political boundaries. The achievement of watershed management, therefore, is a question of social relations, and cooperation between vested interests. These vested interests are separated by political boundaries or institutional arrangements, which rarely coincide with the topographic limits of watershed.

Studies emphasized participation of these vested interests as crucial to the success of soil conservation efforts in watershed. White and Quinn (1992) demonstrated that peasant participation in Integrated Watershed Management Project was economically viable in Haiti. White (1992) argued that for soil conservation to be adopted and sustained, it must be an extension and incremental transformation of existing cultural and technical behaviours. This transformation cannot be forced by external agents but can be achieved by dialogue with peasants. Numerous studies were undertaken to examine the ecological and economic impact of watershed development programme in India. Singh (1989) reviewed the experience of four watershed projects: Mittermari and PIDOW in Karnataka, Ralegaon-Siddhi in Maharashtra, and Sukhomajri in Haryana. The review reiterates that programme interventions seeking to enhance the expected benefits to people, or reduce the expected costs, are likely to elicit stronger people's participation. Other determinants are organization of people into small groups (as in PIDOW) and leadership (as in Maharashtra), equitable sharing of benefits from collective action (as in Sukhomajri), and availability of complementary investment from government.

Chopra et al. (1990) reported that in the lower *Shivalik* region of northern India, the use of participatory approaches resulted in moderate to high rates of return to watershed management, greater than 12 per cent, the cut-off social rate of discount usually adopted by the Indian Planning Commission. Further, the incremental income accrued to different set of beneficiaries. Between households and village society, the project region shared about 71-82 per cent of net benefits. Externalities accruing to the government comprised 18-29 per cent of net benefits. This estimation of benefits to the project region has allowed for the direct and indirect impacts of participatory institutions on incomes of the people as well as of government agencies. Singh et al. (1991) studied the *Kandi* watershed, an economically backward tract of Punjab. The different components of this project and their associated rates of return were forestry (12 per cent), animal husbandry (9 per cent), soil conservation (10 per cent), horticulture (22 per cent), and irrigation (2 per cent). The overall project internal rate of return of 8 per cent represents a substantial shortfall from the earlier expectation of 12-20 per cent according to the feasibility studies. However, the internal rate of return and benefit cost ratios are 38 per cent and 2.23 for *Kinnow* (a type of citrus fruit), 26 per cent (2.48) for mango and 44 per cent (2.30) for guava. An increase in cultivated area is reported from 80.3 to 99.3 per cent, while the irrigated area increases from 1.4 to 48.9 per cent.

Deshpande and Ratna Reddy (1991) selected three micro-watersheds falling in three regions of Maharahtra to study the locational aspects and the consequent difference in technologies adopted. The watershed in the scarcity zone had land development, horticulture, and contour bunding, key line formation and *nala* training as the main soil and water conservation activities. In the second watershed with modest rainfall, contour and graded bunding, *nala* bunding and training, afforestation and grass planting received prominence among the components of watershed management. In the last category of watershed with assured rainfall, drainage, water logging and waterways receive prominence. However, in the watershed treated areas, there is shift towards pulses and oil seeds. The significance of commercial crops also remains in all three locations.

The analysis suggests that irrigation through water harvesting had an impact on total value productivity in both scarcity and moderate rainfall regions. They argue that development of each project is unique in itself, though certain traits are common. The study also made a comparative analysis of the cases of active beneficiary participation as against passive participation. It was noted that participatory process acts as a powerful catalyst for the programme, a result supported by Chopra et al. (1989).

Rajagopalan (1991) contended the integrated watershed development is a system combining erosion and run-off management with land management and the digging of irrigation wells for lifting ground water on a sustainable basis such that the amount of water withdrawn is less than or equal to the annual recharge of groundwater. The impact of integrated watershed development can be seen in improvement in resource productivity, increase in employment, better crops and crop system which ensure continuous sales and regular cash flow, additional area under sustained irrigation and cropping and reduced production risks. He argues that investment in watershed management is an appropriate development intervention, which warrants top priority as 70 % of net sown area suffers from neglect and poverty. Ramanna (1991) contended that the farmers were convinced of the benefits of programmes of watershed management both on arable and non-arable lands in the form of rise in water table level in wells and reduced siltation of tanks. Establishment of micro-watershed *sanghas* in Karnataka has demonstrated how an NGO can fruitfully involve them in watershed development.

Shah (1997) has examined watershed programmes in western Gujarat. A yield gain of 20-30 per cent is expected with an average investment of about Rs. 6000 per hectare. In terms of the acceptability of different components of watershed technology, she reports that in dynamic rainfed region returns from capital-intensive measures such as land leveling, water harvesting and commercial plantations are likely to be higher and are also likely to evoke more interest and participation. *In situ* conservation measures by themselves (including vegetative barriers) may not succeed unless accompanied by measures that are perceived

to be income enhancing. She also maintains that farmers need appropriate technology, even if it is not low cost. Shah (1998) drawing on three case studies (all benefiting from special management funding conditions) doubts the efficacy of watershed-based approaches unless topography and climate are appropriate.

Kerr et al. (1998) reporting on a major survey of projects (AGY, NWDPRA, DPAP and IGWDP, etc.) came to the conclusion that the benefits of watershed development have been negligible, except in a few cases in which participatory approaches have been pursued effectively. The projects- NWDPRA and DPAP follow strict guidelines and are evaluated on the physical targets achieved, which limit the scope for participation by inhabitants of the project area. Of course, the DPAP and World Bank have already changed their approaches. However, Kolavalli (1998) examined the World Bank projects in Rajasthan and Orrisa, and identified continued problems with their performance. In particular, the approach to the choice of technology is still too inflexible, with little or no room for input by farmers, and there is insufficient attention to developing and strengthening community institutions to support collective action. The DPAP underwent a radical change in 1995, but the state and district level administrations have found it very difficult to implement the new guidelines. In fact, few if any, new DPAP projects had made any progress in Maharashtra.

Sadhu and Sudan (1999) have evaluated the impact of IWDP (Hills-I), Jammu and Kashmir. Over the project period, the yield per acre of various crops has increased due to greater use of improved inputs; however, their use is constraints by availability of credit. The development work related to construction of bunds and crate-work has evolved all round criticism. The selection has not been need-based but influence based and resulted into areas prone to soil erosion to degrade further. Due to increase in fodder and water availability, there was considerable increase in milch cattle and thereby increase in dairy activity. The increased agricultural activity, non-farming and horticultural plantation have resulted in reducing labour migration. With the formulation of a few Micro-Watershed Committees (MWCs), the system of people's participation in watershed management has been introduced during the later years of the

project. The record of MWCs' functioning is rather disappointing. The women participation is low, veiled and passive.

Shah (2000) showed that the incidence of drought was much less severe in watershed villages when compared to the adjoining non-watershed or ‘ control’ villages. The study concluded that the “overall impact is not only positive but also impressive. To a large extent the participatory watershed scheme launched in 1995-96 by Ministry of Rural Development has been found to mitigate the impact of drought. However, the study pointed out that the activities and enterprises, which specially affect women such as drinking water and dairying tended to receive less attention. Further, the study observed that the expenditure on drought relief being incurred now be spent more productively by allocating it for watershed development with very little extra expenditure.

Hazara (2000) argued that the entire area of Kharaiya Nala watershed, both arable and non-arable lands were treated with appropriate soil and water conservation measures. Appropriate crop production technology was adopted for arable land, whereas, the pasture, silvipasture and afforestation programmes were taken up in the hills and plateau lands. This has resulted in bringing back about 317 hectare of wastelands into cultivation and helped in arresting run-off and soil loss from 48 percent to 18 percent and 20.5 tonnes/hectare to 0.9 tonnes/hectare, respectively, which resulted in generating irrigation sources from initial 10 percent to 83 percent cropped area under irrigation. All these have adequately reflected in terms of crop productivity, an increase by 6 times over initial level, 50 percent shortage of fodder initially to 16 percent surplus, doubled the milk yield, increased fuel wood availability to 85 percent of requirement from 11 percent availability and significant increase in farm income over initial level. Micro planning on watershed basis had helped in creating awareness and involvement/participation by villagers through creation of village level institutions in the overall management of regenerated community resources.

Wankhede and Mahalle (2000) emphasized that the success of the watershed development programmes lies in the “bottom up approach”. Special efforts are made to involve local leaders, villagers and developments in “watershed literacy

compaign". The impact of the programme is significant in terms of soil conservation and soil forestry activities. The extensive soil conservation and minor irrigation activities have created additional irrigation potential, which helped farmers in changing the cropping pattern in favour of cash crops. Soil conservation works have contributed in conserving soil and re-charging groundwater. Also, groundwater table has increased substantially. Consequently lands, which are higher and used to remain barren, were able to grow minor millets and pulses. Rajendran and Mashar (2000) contended that under the programme "Rural Infrastructure Development Fund, Phase-I", implemented by NABARD in the state of Kerala, soil and water conservation measures have brought about perceptible improvements in productivity of crops leading to increases in overall production. Consequently, the income generated has also shown substantial improvements. Due to policy restriction in providing assistance to farmers depending on income/area limitation, the entire area of the watershed could not perform as expected. Positive improvements have been recorded for cropping intensity, crop productivity and income. The economic rate of return was above 25 percent

The 1994 Guidelines have been in force for long enough to begin only now to have an impact on implementation. Experience suggests several difficulties in designing and implementing participatory approaches to watershed rehabilitation and management. A number of cases have been reported in which NGOs have succeeded in establishing groups based on a village (or on part-usually the disadvantaged part-of its population) in order to rehabilitate and manage watersheds on these principles [Mascarenhas (1998), Fernandez (1993), Farrington and Lobo (1997), Hazare et al. (1996)]. However, with the exception of Indo-German Watershed Development Programme [Farrington and Lobo (1997)] the expansion pathway for these has been slow, relying on replication of the same approach in subsequent areas. Government projects, schemes and programmes generally aim to achieve a moderate 'functional' degree of participation [Farrington (1998)], and yet have been characterized by a number of difficulties. The 1994 common Guidelines have done much to commit the public

sector to a strategy of decentralized and participatory design and implementation of watershed development. A recent review [Turton et al. (1998)], however, suggests the public sector faces several challenges. A study of the performance of local government in Mahabubnagar District of Andhra Pradesh by Krishna (1997) drew attention to how numerous pressures-not least the pressure to spend allotted funds - were causing officials to short cut participatory process. The same study also noted that many Project Implementing Agencies constituted by government staff was, in fact, operating part-time, and had little prospect of meeting the standards of participation and consultation set out in the 1994 Guidelines.

Sikka et al. (2000) argued that the activities carried out in Salaiyur watershed, Coimbatore have shown encouraging people's participation and positive results. The activities related to water harvesting and ground water recharge, plantation of mango and tamarind, land development etc. has received greater social acceptability. Self Help Groups (SHGs) involving lesser investments within a smaller group have proved worthy in generating alternate source of income from non-land based activities, specially for land less people and this has tied up their interests in watershed programmes. They emphasized that bottom up approach with a blend of top down approach is fruitful in integrated watershed management. This is helping in capacity building of local level people's institutions to ensure smooth take over and future maintenance and sustenance of the programme by them after formal withdrawal of project. In Karnataka, the three-tier approach to micro-watershed, basket technology and farmer centred approaches using knowledge utilization strategy has encouraged farmers to participate in technology testing and refinement and allowed them the option to adopt technologies suitable to their specific environment conditions. Thus, the MYRADA-IIRR (Mysore Resettlement and Development Agency- International Institute of Rural Reconstruction) collaboration project has helped farm families to increase their food and bio-mass production and income and also modify the micro-climate by the increased bio-diversity with reduced soil erosion and improved soil fertility. The level of optimism and co-operation among the farmers

has also increased [Eswarappa and Basavaraddi (2000)]. Amma (2000) argued that beneficiary participation is proved to be an integral component for the success of any watershed project. All the users should be involved in development programmes and maintenance of natural assets. Women are the most important vectors of watershed ecosystem as users and losers of the resources. There are situational and institutional myths responsible for her invisible position in watershed development project. So gender issues need to be addressed from the very beginning in proper perspective and integration shall be considered in all watershed development programmes.

IV. Institutions and Transaction Costs

A fundamental objective in managing common property resources is to enhance or maintain the welfare of human beings - both current and future generations. The challenge is to design institutional arrangements to achieve this objective. Users can sometimes create and maintain institutional arrangement that provide for sufficient coordination and enforcement to avoid serious degradation of the resource [Berkes (1989); Bromley et al. (1992); Feeny et al. (1990 and 1996); Netting (1993); Ostrom (1990); and Ostrom et al. (1994). Given the voluntary nature of arrangement to manage the watershed resources and the frequent lack of institutional arrangement to compel cooperation, participants can, to some extent, hold the collective agreement hostage to satisfying their individual requirements. In such cases, higher levels of cooperation may be achieved if the institutional arrangements facilitate limited form of coercion. But of course, arrangements that reduce the costs of coercion are open to abuse [De Alessi (1990)]. The collective arrangements would require more elaborate forms of coordination. Much common is simple system with simple rules, which help economize on transaction costs in negotiating, specifying agreements and enforcement [Ostrom (1992)].

In watershed context, we should examine not only the benefits associated with institutional arrangements, but also the costs of creating and maintaining the arrangements themselves - the transaction costs. From the point of view of a

participating community, net gains matter. When net gains are assessed, the total cost of exploiting/conserving the resource should take account of both the private costs borne by individual stakeholder and the collective cost of operating the resource system [North and Wallis (1994)]. Organization of rural communities in the context of watershed resources is based on group dynamics in which certain individual play key roles. Group coordination is required to create institutions to manage the common property resources. The high transaction costs involved in coordination and conflict resolutions or negotiations resulted in a deadlock (mainly due to political reasons) and either appropriate institution fail to emerge or existing ones disintegrate. This leads to open access situations leading to the tragedy of commons [Hardin (1968)]. Thus, individuals or groups innovate institutions in order to reduce the transaction costs [North (1990)]. In watershed context, collective action outcomes would be preferred when the expected returns are larger than the costs of coordinating collective action. Though transaction costs approach seems to be useful in understanding the problems associated with watershed resources, it cannot explain individual motives and behaviour when it comes to individual initiatives for promoting collective action.

The transaction cost is not a new concept in the literature on management of common property resources. For example, Wiggen and Libecap (1985) point to the importance of contracting costs in inhibiting the utilization of oil pools. Johnson and Libecap (1982) and Karpoff (1987) stress the importance of contracting costs in the management of fisheries. Field (1985,1989) explicitly models transactions cost in his analysis of the choice of private versus communal property arrangements and evolution of property rights for agricultural land. Barzel (1989) also highlights the importance of transaction cost in the choice of institutional arrangements. Caputo and Lueck (1994) explicitly incorporate components of transaction cost in their dynamic model comparing private to communal property arrangements and consider a number of alternative institutional arrangements. They show that the structure of the components of transaction cost determines which arrangement maximizes private wealth. They

also highlight the distributional consequences of various management options, again indicating the limited scope of voluntary agreements.

Comparative studies have generated evidence about the relative magnitude of transaction cost in various circumstances. As large number of case studies have became available, it has been possible to impose crude controls for group size, homogeneity of group membership, nature of physical and cultural environment, type of property rights regime, and other factors that affect transaction cost. Such studies can be used to draw tentative inferences about how institutional arrangement and other factors affect transaction cost and, in consequences, resources management [Feeny (1992); Ostrom et al. (1994)]. For instance, in comparing case studies of 46 irrigation systems, Tang (1991 and 1992) found that systems managed by formal irrigation agencies tend to impose more rigid rules than do farmer-managed systems. In general, the nature of rule structure has implications for the level of transaction costs, because enforcement also depends on the underlying normative behavioural codes or cultural endowments.

The transaction costs are involved in initiating and operationalising participatory processes for watershed management. Transaction costs are the costs of entering into a transaction, over and above the exchange of money for a good. Transaction costs cover a multitude of different costs associated with agreeing to transact. At the simplest level, a transaction cost is an extra payment associated with consummating a transaction [Kolstad (2000)]. For instance, in evolving and developing participatory institutions for sustainable watershed management, there is the cost of the capacity building of the various stakeholders, besides a host of costs associated with the transaction: hiring of expertise (NGOs/training institutes) to impart training on various aspects of participation, transportation and logistic arrangements, financial contribution towards VDCs/ MWCs/ SHGs strengthening, *etc*. The participatory institutions emerge because co-ordinated activities and close proximity of relevant agents and information within a given organisation overcome the transaction costs associated with capacity building of stakeholders. But, of course, co-ordinated activities are not cost less. They come at a logistical cost that increases in line with the growing dimensions and

dynamic complexity of organizations themselves. Hence, at a particular scale of operation, determined largely by the economies of scale associated with the particular activity in question, the logistical costs of co-ordinated activities eventually exceed the transaction costs they seek to avoid. Thus, ultimately, decentralized mechanisms (participatory approaches) offer a better and more efficient alternative to organizational structures [Lawn (2000)]. The bottom-up approach permits the independent and decentralized decisions of rural based stakeholders to give rise, not to chaos, but to a spontaneous order-an order that make the participatory processes more efficient of all known resource allocation mechanisms. The decisions made are largely decentralized and participatory in nature and serve as a useful if not incomplete income redistribution mechanisms, reduces economic power vested in certain individuals and groups, and reduces the governments reliance on the redistribution of income and wealth that suffer from the "leaky-bucket" phenomenon. Besides, participatory approaches are more flexible than its bureaucratic counterparts and adjust to changing rural expectations and needs than are remote bureaucrats and above all, greatly simplify the resource allocation process and thereby have robust potential of influencing the environmental and economic issues in a significant way.

Objectives

The present study directs attention towards participatory approaches at watershed level and examines the effectiveness of participatory approaches in influencing environmental and economic outcomes from watershed development and protection. The study produces insights that are directly relevant to IWDP (Hills-II), Jammu and Kashmir. It helps in determining whether institutional reforms (introduction of participatory approaches) produce sustainable or unsustainable results (in terms of environmental and economic returns) and of options for creating effective participatory approaches with minimum transaction costs in the future.

A. Short-run objectives

The short-run objectives of the study are:

1. To examine the participatory processes adopted under IWDP (Hills-II), Jammu and Kashmir by giving special emphasis on methodological aspects of people's participation, farming system development approach, cost-sharing mechanisms, farming system technology, common property resource management and training needs and institutions.
2. To study and analyze elements of successful watershed management e.g. level of people's participation, gender equity, conservation of natural resources and mechanisms of distribution of benefits,
3. To assess individual farmer's and groups of farmers' efforts in and contribution to watershed development and protection, and environmental and economic benefits there from, and
4. To find out the transaction costs involved in evolving and operationalizing participatory processes and costs involved in implementing various project interventions.

B. Long-run Objectives

The long run objectives of the study are:

1. To document the experiences of participatory approaches in watershed management, its constraints and lessons learned,
2. To develop and recommend suitable policy guidelines to strengthen people's participation and minimize the transaction costs in watershed management.

Hypotheses

The hypotheses tested during the course the study are:

1. Watershed development can contribute to improved natural resource management and agricultural productivity in rainfed areas, but their success continues to be limited by the extent of people's participation.

2. The project interventions seeking to enhance the expected benefits to people, or reduce the expected costs, are likely to elicit stronger people's participation.
3. A reduction in the transaction costs can increase the efficiency and sustainability of participatory processes by increasing the potential net gains in terms of environmental and economic outcomes.

The main development objective of the Integrated Watershed Development Project (IWDP), Hill-II, is to improve the productive potential of the project area, using evolving watershed treatment technologies and community participatory approaches. IWDP (Hills-II) intends to contribute significantly to decreasing soil erosion, increasing water availability and alleviating poverty in the contiguous areas of the *Shivalik* hills. Sustainability of the project interventions is ensured through participatory involvement of project stakeholders/beneficiaries. An associated objective is to assist with institutional development and consolidate progress already made in harmonizing approaches to watershed development management among various programmes operating in the *Shivalik* hills. The project design recognizes the need for policy and institutional arrangements that will ensure long-term sustainability. A "bottom-up" approach is an integral part of the project design and involves all stakeholders during project planning and implementation. The project places special emphasis on building the capacity of communities to take responsibility for maintaining assets created under the project. The participatory approach, which is the corner stone for project implementation and sustainability, is a proactive interactive process with an outcome that cannot be pre-determined without being undertaken. Therefore, the project design is based on learning and evaluation, and continuous dialogue with beneficiaries/stakeholders is essential to adopting meaningful project interventions [World Bank (1999)].

The two major components of IWDP (Hills-II) are institutional strengthening and watershed development and protection. The institutional strengthening component seeks to support stakeholders in the planning, implementation, and maintenance and sustainability measures, strengthen project implementing

agencies, research, extension and training. The watershed development and protection component seeks to promote proven locally adopted vegetative technologies and mechanical structures through active beneficiary (landless, livestock herders, women and disadvantaged groups) involvement to conserve water and reduce soil erosion [World Bank (1999)]. Thus, a study of participatory approaches, the transaction costs involved and its influence on environmental and economic outcomes is imperative in the context of watershed development project like IWDP (Hills-II), Jammu and Kashmir. The proposed study will examine the participatory processes' methodologies and other aspects of people participation in watershed development and protection, along with the transaction costs involved and environmental and economic benefits there from. The recommendations of the proposed study will be helpful to policy-makers and project functionaries in scaling up the participatory and equitable approaches and minimizing transaction costs to watershed development and protection in order to maximize environmental and economic returns from various project interventions.

Data and Methodology

A.Type of Data

During the Khon Kaen Conference (1985), different types of Rapid Rural Appraisal (RRA) techniques were identified, one of which was labeled “participatory”. The orientation of a participatory rural appraisal was to facilitate or stimulate community awareness and capability regarding a problem or issue. Particular attention was given to enabling local people to conduct their own analysis of problems, and to share their findings. The role of the outsider became one of catalyst, rather than one of expert. Stimulation of community awareness and capability was also intended to reduce the extractive nature of RRA, and to help local people to empower themselves. In that regard, what became known, as Participatory Rural Appraisal (PRA) is consistent with some of the basic aspects of sustainable development (local empowerment, equity, social justice) [Conway and McCracken (1990). The primary data has been collected using well-structured and pre-tested questionnaires, participatory rural appraisal (PRA)

techniques and group meetings. The study has generated data on four sets of variables: participatory processes, the transaction costs, and environmental and economic issues. Whenever possible and required, secondary data sources have also been utilized.

Through participatory observations and focus group discussions, it is possible to describe what goes on, who and what is involved, when and where things happen, how they occur, and why-at least from the stand point of participants-things happens as they do in particular situations. The methodology of participatory observation and focus group discussions has been used to ascertain important differences between the views of insiders as opposed to outsiders. Keeping in view, the objectives of the proposed study in mind, the participant observation inquiry has been helpful in an open-ended logic and process of enquiry as well as qualitative description of the phenomenon under study. The sample size has been restricted to the members of the VDCs selected under IWDP (Hills-II) in the selected sub-watersheds. Three VDCs each has randomly been selected from the sub-watersheds of Akhnoor and Ramnagar.

The team strategy has been used to collect data and information. The Principal Investigator, himself has assumed the role of participant observer/moderator (as the case may be) and has been assisted by Co-Investigator and two research assistants to collect data and information, to gain access to multiple perspectives. Both the unfocused and focused observation techniques have been used. The unfocused initial has been use to become increasingly familiar with the insider's world to refine and focus subsequent observation and data collection. All the observations have been recorded on site and misunderstanding, if any has been corrected thereof.

In all the focus-group observations, 10-12 stakeholders have been recruited from different settings. Highly formal interviews have been conducted using structured interview schedules. In-depth interviews have also been conducted to elicits opinion regarding strengthening of participatory processes, of stakeholders with extensive knowledge of the phenomenon under study. Besides, study has been

supplemented by utilizing potentially rich sources of secondary data and research materials.

The content analysis technique has been used to analyze the data and information qualitatively and quantitatively (using descriptive statistics). The content analysis technique has been supplemented by use of code and labels, field notes, sorting, shifting, constructing and reconstructing these materials, in order to prepare the draft and final report. Besides above, the proposed study has also used Ostrom's model "Crafting Institutions for CPR" (1990) to evaluate the participatory processes and their impact.

B. Sources of Data

The primary data has been collected from household level respondents, members of Village Development Committees (VDCs), and user groups, project functionaries and other stakeholders. The secondary data, whenever required, has been collected from the project authorities and the government/non-government agencies.

C. Arrangement for Data collection

A team of trained research investigators (including two research assistants) has been deployed for the collection of primary/secondary data from the selected sub-watersheds. Before entrusting the task of primary data collection, the research investigators have been given proper orientation in participatory rural appraisal (PRA) techniques, focus group discussion and the various aspects of the problem under investigation. The household survey has been drawn on a stratified random sample of village household. The questionnaire(s) were pre-tested before the main survey with small 'focus' group assembled to discuss their reactions to questionnaire prior to detailed survey.

In order to collect primary data and information on participatory processes, PRA exercises and group meetings have been held separately for male and female members of VDCs in a smaller and homogeneous group. Besides perceptions of the members of VDCs and user groups have also been elicited on various

aspects. During PRA exercises and group meetings the ways in which participatory processes affects the groups and the changes in their access to and use of forest products and other resources has been discussed. Gender issues, benefit and cost sharing practices, decision making process, participation and representation in users committee, ethnic and gender representation in users committee, nature of existing conflicts, etc. have been assessed by group discussion. The data related to the transaction costs involved in evolving and operationalising participatory processes as well as the costs of various project interventions has been utilized and collected from the project functionaries at sub-watershed level.

D. Analytical Techniques used

The general description of socio-economic, institutional context and technical aspect of the participatory processes has been comparatively presented by using descriptive statistics. The institutional context and technical aspects of the participatory processes have been assessed on the basis of data (primary and secondary) so collected for the purpose. Factor analysis and multiple regression techniques have been used to analyse socio-economic dimension of participation. The study has also use Ostrom's model "Crafting Institutions for CPR" to evaluate the participatory processes and their impact. One essential feature of institutional arrangements is their operating cost. The major costs of conducting resources management are the cost of gather information, design regulations, coordinate participants, monitor conditions, and enforce regulations. These are called transaction costs [Matthews (1986)]. For a public resource agency or management organization, transaction costs are related to its coordinating function: data collection, analysis, design and implementation of regulations, communication, and conflict resolution. For individual resource users, the transaction costs of resource management are related to participation: the cost of work time lost to meetings, time required to acquire information and communicate to other users, and direct monetary expenditure for information, travel and communication [Hanna (1995)]. The transaction costs involved in

operationalizing participatory approaches have been identified and estimated by conducting participatory appraisal excercises with project staff and members of users groups and executives of village development committees. Besides, in case of project implementing agency, secondary data on transaction costs have been used.

E. Data Analysis

The participatory processes adopted under IWDP (Hills-II), Jammu and Kashmir has been analyzed both quantitatively and qualitatively. Broadly the focus of the study has been on participatory approached and institutional issues, technical issues, and environmental and economic impact.

F. Sampling Design

To evaluate participatory processes, the study has been undertaken in three Village Development Committees (VDCs) from each sub-watershed namely Akhnoor and Ramnagar. Therefore, a total of six VDCs have been selected with the consultation of project functionaries at sub-watershed level. For the collection of primary data and information on environmental and economic variables at household level, three micro-watersheds/villages each from the two sub-watersheds of Akhnoor and Ramnagar, where a maximum number of people are known to have benefited from each project intervention have been selected. In the non-beneficiary category, 6 sample villages have been selected on random basis, each 20-25 km away from the sampled micro-watersheds villages (*i.e.*, project area). Therefore, a total of six VDCs (three each from selected sub-watersheds) and twelve villages (six each from 'project' and 'non-project' area) have been selected for collection of primary data and information. The stratified sampling technique has been used to select villages (where VDCs have been created, as well as 'project' and 'non-project' villages). During the stratification, care has been taken to include both "forested watersheds' villages and agricultural watersheds' villages" in order to makes a comparative study. For the collection of primary data, a purposive sample of approximately 20 per cent of

household level respondents in 'project' and 'non-project' area and all the members of VDCs have been selected as the base of enquiry. The primary data and information has been collected from the sub-watersheds of Ramnagar and Akhnoor at household level and the members of VDCs (See table 1.1).

Table 1.1: Total Population and Sample Size according to Type of Watershed (No.)

Types of Village	Types of watershed	Household	Sample Size	Members of VDC
Project Area with VDC	Sub-Watershed: Ramnagar			
Sunetar	Forested	500	98	15
Johnu	Forested	72	18	12
Dehari	Agricultural	329	69	19
Project Area without VDC				
Kuh Nala	Forested	160	32	
Badhak	Forested	100	25	
Kaghote	Agricultural	310	62	
Non Project Area				
Darsoo	Forested	175	35	
Chapper	Forested	65	13	
Kishanpur	Agricultural	120	24	
Total		1831	376	46
Project Area with VDC	Sub-watershed: Akhnoor			
Chohara	Forested	184	62	21
Maira	Forested	279	55	12
Ambarain	Agricultural	206	41	11
Project Area without VDC				
Chigial	Forested	75	15	-
Palwan	Forested	90	19	-
Charda Gran	Agricultural	190	38	-
Non Project Area				
Bhamla	Forested	400	80	-
Amb Garota	Forested	238	49	-
Jad	Agricultural	218	45	-
Total		1880	404	44

Descriptions of the Watersheds Covered in the Study

The State of Jammu and Kashmir with an area of 1,38,214 km2 comprising the uppermost drainage of Indus, Jhelum, Middle Chinab and Western Rabi exhibits great contrast in relief features, climate, soil and vegetation within comparatively narrow geographical spread. The climate of lower plains of Jammu and Kashmir

that merges with plains of Punjab is sub-tropical. The climate is predominantly sub-tropical in the main Shivaliks. The climate in the region covering upper reaches of Pir-Panjal forming the main mountain backdrop changes from sub-tropical in the lower reaches to moist-temperate in upper reaches. The climate of Kashmir Valley (bordered between the Great Himalayas and the Pir-Panjal is dry temperate. The great Himalayan range: the innermost line of high mountains with Ladakh situated in trans-Himalayan zone is a cold desert and experiences sub-zero winter temperature.

The Integrated Watershed Development Project (IWDP) Hills-I was started in 1990, and concentrated on integrated development of high priority zones of rainfed areas. The total area of Shivaliks and Karewas is 9.45 lakh Ha. (Shivaliks: 7.50 lakh Ha and Karewas : 1.95 lakh Ha) ; and about 5.9 lakh Ha. is identified as problem area, out of which, 0.52 lakh Ha. (8.81 percent of the problem area), have been treated under IWDP (Hills-I). This includes the sub-watersheds of Devak and Ramkote in Shivalik hills (Jammu region) and Dudhganga in Karewas (Kashmir Valley). IWDP (Hills-II) targets another 0.61 lakh Ha. (10.33 percent of the problem area), leaving balance of 4.77 lakh Ha (80·86 percent of problem area) still untouched.

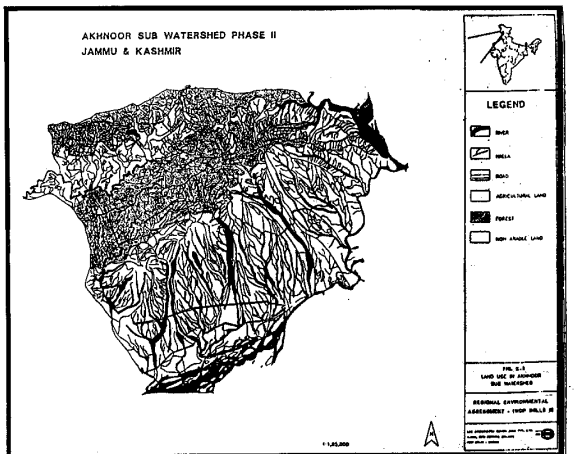
Table1.2: Project Area under IWDP (Hills-II), J&K

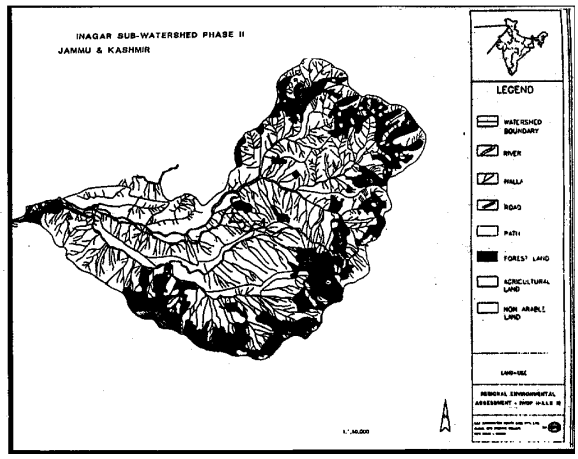
Agro-Climatic Zone	Formation	Sub-Watershed	District	NO.of MWS	Area Hectare	Area to be treated
Sub tropical	*Shivalik*	Ramnagar	Udhampur	39	32630	22500
		Akhnoor	Jammu	37	42350	23200
Temperate	*Karewas*	Rajwar	Kupwara	8	29813	6700
		Rambiyara	Pulwama	24	28500	10000
Total				108	133293	60700

Source: *Project Implimentation Plan,* IWDP (Hills-II),J&K.

The Integrated Watershed Development Project (IWDP) Hills-II, Jammu and Kashmir covers two sub-watersheds in Shivaliks, viz. Ramnagar and Akhnoor and two sub-watersheds in Karewas, viz. Rajwar and Rambiyara. The proposed study will be confined to two sub-watersheds of Akhnoor (Jammu district) and Ramnagar (Udhampur district). While Ramnagar is in the inner Shivaliks, Akhnoor is on its outer part. Ramnagar sub-watershed is the catchment area of

Ramnagarwali Khad (ephermal) in the middle catchment of river Tawi. It has an area of 32,630 Ha. and is subdivided into 39 micro-watersheds. Akhnoor sub-watershed with an area of 42350 Ha. is sub divided into 37 micro-watersheds. It covers about a dozen rivulets (nallahs) and a large number of small nallahs originating from Kalidhar ridge and draining into Chinab river on the western portion of Kalidhar ridge, drains join Manawar Tawi which in turn also meets the Chinab river.





The Shivaliks, locally known, as ‘Kandi’ comprise of piedmont deposits made of boulder and pebbles, gravel and sand with minor clays mixed in varying proportions. One of the characteristic features of the area is the stream called choes or khads, which remain dry for most of the year. Though total rainfall is high (average 1000-1500 mm.), but its distribution is very erratic resulting in frequent droughts. This area is subject to soil erosion due to undulating topography, steep slopes, poor vegetative cover (scrub forest) and coarse to medium texture of the sedimentary material. Shivalik hills consist of highly erodible sand stones, conglomerates, siltstones and shales.

The uncontrolled deforestation and overgrazing in the past has resulted in the reduction of vegetative cover and accelerated erosion in the shivaliks. The area experiences paucity of water for plant growth due to excessive run-off, high evaporation especially during summer, and unpredictable and erratic rainfall. The eroded material from Shivalik hills, brought down by the seasonal rivulets (choes) is deposited in the sloping piedmont plain and also in the area around choes. The

repeated deposition of coarse sediments renders these areas comparatively low in agricultural productivity. Due to lack of irrigation, subsistence rainfed agriculture is the prevalent production system is selected sub-watersheds. In terms of physiographic features, there may not be 100 per cent similarity between the two sub-watersheds but, certainly, in term of accessibility, natural resource endowment, infrastructure development and general index of socio-economic awareness, two sub-watersheds are comparable. IWDP (Hills-II) is spread over predominantly rural areas. The indigenous population in the sub-watersheds is Scheduled Tribes (STs). The Scheduled Castes (SCs) are other disadvantaged social groups. In total, the project area is dominant in terms of SC population and ST population is negligible. Other social groups in the project area are nomads. The predominant economic base of the project area is primary sector activities. Agriculture is the mainstay of the rural economy, as over two-third of the population is engaged in agriculture and allied activities. Tertiary (service) sector activity assumes greater significance next to primary sector activity in the near-absence of any manufacturing units, especially the small and medium scale manufacturing units.

CHAPTER – II

Participatory Approaches And Watershed Management

During the recent past, there has been fundamental change in the beliefs about the role of the state in developing countries, from regulator to facilitator in the process of development in which a coalition of different actors and institutions are involved [Carney and Farrington (1998)]. The emphasis has been laid on "partnership" approach, in which state has to work together with NGOs, private sector, and people's organizations, so that comparative advantage of each party can be exploited [World Bank (1997)]. The need for change is justified on numerous grounds such as low growth rate, lower living standard of the majority of population, poverty, environmental degradation, financial mismanagement, waste and corruption, etc. The natural resource management is an area where the institutional reforms have been implemented vigorously, and as a part of the change, participatory approaches has been implemented in numerous projects related to agricultural development, horticultural development, forest development, watershed development, etc. With the institutional change, some of the activities performed by the government functionaries are supposed to be taken over by the participants in the reform process. Under IWDP (Hills-II), Jammu and Kashmir institutional reforms have been implemented for watershed development and protection in various sub-sectors such as provisioning of agricultural services, forestry, water resources, etc. The local level stakeholders have been entrusted with the task of actual management of natural resources to make more productive use of those resources. It has been emphasized that the institutional change will facilitate reduction in transaction costs involved in operationalizing the programme of participatory watershed development and protection. The users' participation in resource management would ensure proper maintenance and sustainability of the assets created over the project period and would facilitate smooth withdrawal and improve the performance of the project. However, poorly planned withdrawal clearly does not bring such

advantages and may pose threats particularly to the livelihoods of the poorest and to the environment.

The recent reform in user participation in natural resource management has highlighted the importance of user groups. The existing natural resources in the selected sub-watersheds of Jammu and Kashmir share three essential features, which support participatory approach in natural resource management. The ownership of forests, water resources and pastures and grazing lands is vested with the state, which does not have the capacity to regulate their access and use. The individual resource management is difficult due to lack of defined boundaries in case of water resources and pastures and grazing lands, and at the same time the cost of supervision is supposed to be high. The most natural resources have multiple users and uses; therefore private management ignores the equity aspects of natural resource management. These issues are now widely accepted and user participation in natural resource management has been widely encouraged under the reforms. It has also been argued that common property resources (CPRs) are more effectively and efficiently managed through users' participation than state's regulation and control. The user groups have a direct stake in the future of the resource, which they are managing, better and easy access to information about local needs, so that they can take prompt action as per changed situation. The stability and robustness are essential qualities for user groups for successful management of natural resources [Wade (1988) and Ostrom (1990)]. However, the successful management of CPRs must be integrated into users' livelihood strategies. For instance, in case of water user groups the success can be defined in terms of increased cropping area or intensity, rising real per capita incomes, increased water use efficiency, improved productivity per unit of water, or improved equity and access to irrigation [Turral (1995)]. Thus, the determinants of success should be identified to judge the performance of the user groups and overall success of reforms. Besides, the scaling up and replication of the success of the reforms is also important.

Design Principles and CPR Institutions

"Design principles" implies an essential element or condition that helps to account for the success of CPR institutions in sustaining the CPRs and gaining the compliance of generation after generation of appropriators to the rules in use. The following design principles are necessary conditions for achieving institutional robustness in CPR settings [Ostrom (1990)].

- Clearly defined boundaries
- Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.
- Congruence between appropriation and provision rules and local conditions
- Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labour, material, and/or money.
- Collective-choice arrangements
- Most individuals affected by the operational rules can participate in modifying the operational rules.
- Monitoring
- Monitors, who actively audit CPR conditions and appropriator behaviour, are accountable to the appropriators or are the appropriators.
- Graduated sanctions
- Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both.
- Conflict-resolution mechanisms
- Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.

- Minimal recognition of rights to organize
- The rights of appropriators to devise their own institutions are not challenged by external government authorities.
- Nested enterprises
- Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

For these design principles to help persist the CPRs and their related institutions, they must affect incentives in such a way that appropriators commit themselves to conform to operational rules devised in such systems, to monitor each other's conformance, and to replicate the CPR institutions across generations.

Participatory Processes under IWDP (Hills-II), J&K

In the context of IWDP (Hills-II), J&K, institutional reforms for watershed development have been carried out by identifying the ways through which the poor people have been supported in identifying their emergent needs and priorities, with the goal of creating robust institutions to manage the CPRs in sustainable manner. In order to operationalise the institutional arrangement, the following participatory processes have been followed in the selected sub-watersheds with minor variations across the forested and agricultural watersheds.

Initial Preparation

Though some of the local professionals and field workers already had some knowledge of, and experience with, the local setting, to avoid preconceptions IWDP (Hills-II) has made efforts to maintain a receptive and open frame of mind. Indeed, especially at the beginning of the project, there were many unknowns and uncertainties about the environmental and social situation of the selected sub-watersheds. Therefore, information gathering was considered necessary before launching the participatory process. This preparatory activity included:

Review of existing information, complemented, when necessary, by rapid appraisals of specific environmental or social issues;

Tentative identification of the communities and sites in the project area that, in light of both technical and political considerations, were the most suitable for implementing the process of participatory and integrated watershed management; and

Preliminary visit to the short-listed local communities, aimed at validating the initial choice.

At the beginning of the project, a period of three to six months was devoted to accomplishing these tasks.

Reviewing Existing Information

Gaining an understanding of the environmental, social and institutional situation of the project area was obviously essential for identifying the key issues, opportunities and constraints to be considered in designing and organizing subsequent phases of the participatory and integrated watershed management process.

To this end, the IWDP (Hills-II) considered the following basic information:

General physical and environmental features of the area: size, altitude, rivers, climate, rainfall, slopes, soil, vegetation, natural resource degradation, etc.;

Population trends: size, natural growth rates, migration, density, type of settlements, etc.;

Social and economic situation: social stratification, indigenous social organization, cultural background, literacy, the status of women, food security, health conditions, land tenure, farming system, off-farm activities, etc.; infrastructure and social services: roads, communications systems, credit, health, education, etc.; and

Institutional setting: line agencies, NGOs, grassroots organizations, rural banks, ongoing development initiatives in the area, etc.

Conducting Complementary Studies

At the beginning of the project, the project-implementing agency found that it was not necessary to carry out more structured preliminary inquiries. However, at a later stage, the validity and accuracy of the project's background information was often criticized as being too superficial to support informed decision-making. Project staff working in the field sometimes questioned the biophysical and demographic data gathered from existing sources. Furthermore, major gaps were often found in the information regarding community social organization, farming systems and local knowledge. The project has hired the services of local consulting firms to carry out complementary studies such as 'Shivalik Development Strategy", Retrospective Study, IWDP (Hills-I), "Prospective Study on Social Assessment', Tribal and Transhumance Study', etc. To obtain sounder information, both conventional and Rapid Rural Appraisal (RRA) methods were used to carry out complementary studies according to specific needs. The focus of these studies differed, however, there were three common areas of research: farming systems research, environmental analysis, and social surveys.

Short-listing of Communities

At the beginning of the project, IWDP (Hills-II) attempted to select participating communities according to strictly technical and managerial criteria, such as high environmental risk (degraded upland zones generally received a higher priority), and relatively strong community organization (the existence of grassroots organizations that could potentially become project partners was considered an important asset). However, it quickly became clear that the project could not adhere strictly to these criteria. In particular, kinship structure, ethnic or caste interests, and affiliation with political parties and interest groups proved to be elements strongly influencing the final decision about where to start the participatory process and who to involve.

Initial Visits to Short-listed Communities

An especially important element in site selection was the initial visit to the sort listed communities, with the threefold aim of:

Exploring the community's interest in collaborating with the project;

Identifying potential actors in starting the participatory process (grassroots organizations, interest groups, concerned individuals); and

Making organizational arrangements for subsequent phases of the participatory process.

In some cases, extension workers made introductory visits of one or two days to the communities. On other occasions, these visits continued over a longer period of time, often through informal contacts with community members. Despite these differences, most visits included the following three core activities:

Formal visits to community leaders and influential people: Staff members presented the project to local authorities and expressed their intention of establishing a partnership with the community. The community's problems were also discussed and the interest of the community leadership in collaborating with the project was explored.

Informal interviewing: Conversations with individuals and spontaneous discussions with groups of people often provided important insights into the local situation, the problems at stake, the basic features of social organization and potential sources of conflict. They were also essential in identifying key informants to be consulted during subsequent phases of the process.

Community meetings: At the end of the visit, community-wide meetings were held with the support of local leaders. In these meetings, project staff presented the rationale and purpose of participation appraisal and planning exercises. Gender was a major consideration during the initial visits, allowing the project to promote the involvement of women in the subsequent phases of the participatory process.

Initial Participatory Rural Appraisal

The main goal of the initial participatory rural appraisal (PRA) exercise was to support community members in better assessing their situation and identifying the most important and urgent goals to be pursued through participatory action. Another objective was to collect additional and more detailed information on the

local environmental, social and economic setting, according to the local perception. To carry out the PRA exercise representatives of other local institutions were also involved. These teams typically included the project's social development functionaries, mid-level technical staff and extension officers. A hired consultant with solid experience in participatory action-research provided technical assistance to the team, especially at the beginning of the project. The consultant acted both as a trainer and as a team coordinator. This was highly instrumental in later allowing local team members to acquire the necessary skills for conducting similar exercises on their own. Initial participatory exercises tended to be comprehensive, covering the community's environmental, social and economic conditions.

Based on preliminary studies, field visits and the consultant's inputs, team members identified specific needs to be addressed, which included:

Community's population and social organization;

Income generation and the distribution of wealth;

Education and literacy;

Gender issues;

Accessibility and use of social services;

Community's infrastructure;

Functioning and productivity of farming systems; and

Management of common natural resources.

A number of participatory research and action-learning techniques were used in the framework of these exercises, including:

Thematic group discussions based on a list of topics or on an open ended questionnaire;

Time-line analysis to collect information on events occurring in the far past, project staff often asked community elders to take part in the exercise or interviewed them separately;

Transect walks to explore significant environmental and agricultural features; and

Participatory mapping to prepared maps of the community's territory, the village or a sample of forms, which highlighted important environmental, social or agricultural features.

Participatory Planning Meetings

The participatory rural appraisal ended with a series of shorter meetings. The main activities carried out during these meetings were as follows:

Feedback of participatory rural appraisal information to communities;

Identification, analysis and prioritization of problems by participants;

Identification of solutions; and

Drafting of a tentative action plan.

Participatory Feasibility Analysis

Through participatory feasibility analysis, project management and field staff reviewed participating community members' ideas for action that were developed during the participatory planning meetings, with the aim of assessing the feasibility of the proposed action in the light of the existing conditions. In most cases, this required an intensive discussion with community members on technical aspects of the proposed activities, available incentives and subsidies, and requisites the community should meet for engaging in a partnership with the project. This interaction ensured that the process continued to be participatory. The purpose of the participatory feasibility analysis was to carry out a rapid and practical analysis that would allow for a decision to be made on whether or not to implement the activity in question. Procedures commonly adopted for conducting the rapid analysis included:

Short-listed activities: Very often, plans prepared during the participatory planning meetings were redundant and over ambitious, and certain activities seemed to be technically unfeasible. Furthermore, staff often felt the need to focus on those initiatives that best responded to the project's mandate and operational capabilities, such as activities related to the management of CPRs, improvements in the efficiency and sustainability of farming systems, the

diversification of income generation, the empowerment of rural women and the building of small-scale infrastructure.

On-site verifications: Project prepared a list of minimal conditions for implementing short-listed activities and entrusted field staff with the responsibility of the verifying whether these conditions had been met on site. Field staff generally carried out this verification in a participatory fashion, with the concerned community or interest group actively involved in decision-making

Making Implementation Agreements

Following the feasibility study, operational agreements for implementing the activity were made. Making implementation agreements basically entails making decisions about practical issues, such as use of resources. The process of making an implementation agreement required the following:

Preparing the design of the activity: Based on the results of the feasibility analysis, a technical design of the activity was prepared that included the definition of services (training, extension services), materials and incentives to be provided by the project, the contributions to be made by the interest group and a tentative schedule.

Group strengthening; For the sake of transparency, to promote sustainability of the interest groups and to facilitate conflict management, project helped formalize the structure and the operations of the user groups or village development committees (VDCs) collaborating on the activities. This usually involved establishing clear rules for membership, watershed revolving fund, record-keeping systems and election of a formal leadership body. Fulfillment of these requirements was often stated as a condition for working with the project.

Negotiation of task-sharing and cost-sharing arrangements: Project staff held a few meetings with the concerned VDCs to review in detail the village development plans (VDPs) and to amend it according to their comments and suggestions. At this time, negotiations determined the inputs to be provided by each party and established simple participatory monitoring procedures.

Finalization of agreements: Based on these negotiations, the participants defined the terms of reference for reciprocal collaboration. When money was involved, this usually took the form of a written ‘implementation contract’ between the project and the VDCs or user groups.

Making implementation agreements was at times a long and tiring process. The main problem in this process was the ‘non-participatory’ attitude of local institutions, communities and sometimes project staff. Top-down decision-making and bureaucracy often hindered the collaboration with governmental agencies. Strengthening VDCs and user groups and meeting basic needs figured prominently at the beginning of the participatory and integrated watershed management process whereas later, attention progressively shifted towards environmental issues.

Strengthening VDCs and user groups: Project made significant efforts towards facilitating the formation and development of user groups and community organizations. The role of VDCs in project implementation was in general less direct than that of user groups. However, VDCs were often highly instrumental in coordinating the activities of user groups and in providing a local forum for the exchange of experiences among groups and individuals.

The participatory development functionaries of the project played a major role in the strengthening of user groups. They attended all relevant training activities and were part of the participatory monitoring, evaluation and replanning team, and provided constant support to all user groups formed in the project area. They assisted user groups in such areas as organizing and conducting meetings, defining group constitutions and keeping records. Activities carried out by the project to strengthen the structure and operational capacities of VDCs and user groups included:

Support for internal operations: When necessary, the project supported user groups and VDCs in defining their procedures for carrying out work and sharing tasks. The staff in charge facilitated the group’s operations, especially at the beginning. However, the project tended to withdraw this type of support as the

groups progressed towards self-reliance. In exceptional cases, the project acted as a mediator to negotiate internal conflicts.

Managerial capacity-building: Project staff held training courses and workshops on such topics as short-term planning, monitoring, financial management, record-keeping, leadership and communication, the management of meetings and conflict resolution.

Micro-capitalization: Establishing a small watershed fund was considered an essential element of VDCs' self-reliance. Moreover, these common funds were found to have positive effects on the group's cohesion, commitment and sense of responsibility. Micro-capital was usually generated through membership fees. A treasurer was appointed and trained to manage these funds, and, when feasible, a savings account was opened in a local bank to familiarize people with basic banking procedures. Once a significant amount of savings was available, re-investment was encouraged, often in the form of loans to members wanting to engage in individual income generating activities.

Facilitation of linkages among user groups and VDCs: Meetings, social events and reciprocal visits among user groups and VDCs in the project area provided opportunities for exchanging ideas and experiences.

Communication activities: Information on the activities and achievements of user groups and VDCs was disseminated. All of these activities were instrumental in motivating more people to join the existing groups and VDCs or to form new associations.

Meeting basic needs: Project was committed to supporting activities aimed at meeting basic needs not directly related to natural resource management. This included income-generating activities and improvements in local infrastructure. The project paid special attention to initiatives promoting the economic independence of women, decreasing their workload and improving their living conditions.

Income generating activities: Community members' needs for increasing their cash revenue were a strong incentive for the formation of user groups. To fulfill this need, the project supported and promoted a variety of short-term income

generating activities. These included both on-farm activities (such as courtyard animal raising, commercial vegetable gardening and agro- forestry production) and off-farm activities (such as cottage industries, handicraft production). All of these income-generating activities were small scale, low budget initiatives targeting the local market (i.e. the exchanges taking place in the local community or, at best, in the immediately surrounding area). Because of their small scale, the project and participants were able to start these activities with very limited initial investment and risk. However, their small scale also meant that they only generated a small income. These activities were useful for satisfying the immediate personal needs of participants, especially women, and increasing the groups' self-reliance. Only in a few cases was a significant capitalization process started through these initiative. Usually, the project and/or line departments provided external support, including technical and administrative training, extension services, selected inputs and credit.

Community infrastructure: The enhancement of the community's infrastructure was often identified as an additional need in participatory planning exercises. A number of user groups spontaneously formed to build water supply systems, to improve roads and bridges, or to construct small public buildings. Responding to the demands for support in this area often provided the project with a good entry point for establishing a partnership with the community. In some cases, these activities also played major role in creating environmental awareness.

Strengthening communities competence and awareness in natural resource management: Two main areas of activity were part of this core component of the project's implementation strategy: improvement of farming systems; and Management of common property resources.

Improving farming systems: Most of the project- supported initiatives for improving farming systems developed out of negotiations between participants who wanted to have better yields, earn a higher income and save time, and the project's core mandate for promoting the conservations of water, soil and vegetation cover. Therefore, these initiatives were 'conservation by use' activities that sought a healthy balance between environmental and economic needs.

Managing common property resources: In the project area, most initiatives for managing common property resources (CRPs) have been more or less directly associated with farming system improvement. Thus, with regard to water and soil conservation and agro-forestry initiatives, it is often difficult to make a sharp distinction between CPR interventions and those for farming system improvement. However, three main types of activities focusing specifically on CPRs can be identified:

Regeneration of public forests and rangelands, which resulted from entrusting local communities with the responsibility for management. This included, 'social fencing' (i.e. restrictions on land use imposed through regulations, not physical barriers), fire control and the introduction of household technologies to decrease fuelwood consumption;

Control of the effects of erosion, such as landslides and gullies, which cause major damage to agriculture and property; and

Management of streams, including measures for controlling water power and down stream erosion or facilitating the recharging of the local water table.

During participatory planning, user groups and VDCs often identified and then implemented activities in these areas in response to a specific need related to their livelihoods. On several occasions during participatory planning exercises, participants expressed the need for soil and water retention measures for preventing landslides, gullies and river floods from affecting arable land, houses and roads. To address this need, the project supported forestry plantations and small-scale environmental engineering works by providing technical assistance and incentives. The project also promoted the sustainable use of forestland by testing agro-forestry techniques for fodder production. Major efforts were also made to sensitize people to the environmental risks related to deforestation and overgrazing. As part of the integrated system of agriculture, livestock rearing and agroforestry the project prompted additional reforestation and erosion control measures of communal interest, such as roadside tree planting and the establishment of erosion control hedges along the borders of agricultural fields. Moreover, participatory planning exercises identified the need to control the

consequences of erosion, such as landslides and gullies that were affecting communal grazing areas and private agricultural plots. To this end, technical assistance, training and incentives were provided to the user groups concerned. Actions facilitating better water management were undertaken in the framework of farming system improvement initiatives.

Participatory Monitoring

Participatory monitoring consisted of the continued follow-up of the organizational and technical aspects of an activity's implementation. The local participants conducted it, with some support from project staff. Participatory monitoring paralleled the implementation process and was intended to enable participants and staff to conduct the following tasks: assess the progress made in implementation; identify and address difficulties and constraints in implementation; and revise the implementation plans accordingly. Participatory monitoring practice progressively focused on three selected elements: self-monitoring by VDCs, the monitoring of implementation agreements and technical monitoring of natural resource management activities.

Self-monitoring consisted of the following activities:

Verifying whether all group members honoured ordinary duties mandated by internal regulations;

Assessing whether commitments made in previous meetings were accomplished appropriately and on time;

Solving problems progressively met during the implementation of the activity; and

Organizing the continuation of ongoing work

The periodic monitoring of implementation agreements was highly instrumental in:

Providing participants with external feedback on their organizational and technical performance;

Changing the original design of the activity in light of practical contingencies; and

Making project staff and management aware of what was happening in the field.

Project staff conducted technical monitoring for individual participants or groups involved in activities requiring innovative practical skills and know-how, such as on-farm experiments and CPR management initiatives. This was done through participatory extension visits during which farmers and staff conducted field observations and measurements, discussed this information in light of previous records, and agreed upon actions to be taken to correct technical errors and deal with subsequent stages of the activity or experiment.

Participatory Evaluation

Participatory evaluation aims at extracting the lessons from the implementation experience. Participants and staff through interactive techniques conduct it. It strives to identify both the positive and negative aspects of the work completed and to provide suggestions for future plans. In the project, participatory evaluation proved to be essential in refining the content and methods of participatory implementation. Furthermore, by linking past experience and future planning, it contributed to ensuring continuity and 'vision' to overall participatory process.

Evaluation exercises focusing on the technical quality of the work sought to answer the basic question: "How good are the results of our work?" These evaluations considered physical work (such as building infrastructure, establishing soil conservation measures and reforestation works) and assessed whether the work was done according to the recommended technical specifications and whether these specifications were sound. These exercises, jointly carried out by the farmers concerned and the project staff, often contributed to identifying immediate actions for upgrading the work and led to suggestions for improving the technical design of similar works in the future.

Progressive Withdrawal of Support

Major efforts were made to allow user groups and VDCs to carry out different activities with less project support (i.e. decreased methodological, technical and

financial assistance). Progressive withdrawal of support to local actors in participatory planning, implementation and evaluation had a dual objective:

Promoting the self-reliance of VDCs in managing their own decision-making and action-taking process; and

Decreasing the costs of support in each site, so that resources could be used to extend the process to other communities.

Promoting Forums for Collaborative Watershed Management

Participatory and integrated watershed management cannot become collaborative if it is not strongly supported by local governments. VDCs must have the option of referring to an administrative authority with whom they can negotiate. Development and conservation initiatives should be conducted within a local strategic planning process, coordinated by the government bodies of the district. These considerations are especially important in view of the decentralization process and the establishment of bottom-up local planning structure. The project helped local governments to strengthen their planning strategies and include in these strategies elements of participatory and integrated watershed management. The main activities the project carried out in this area included:

Sensitizing local institutions: Project carried out activities to sensitize local administrators and professional to the participatory and integrated approach to natural resource management and human development, and to improve their competence in this area.

Promoting inter-sectoral collaboration among local line agencies and NGOs: Cooperation among line agencies and sectoral NGOs is essential to local planning and is also key element in participatory and integrated watershed management. In selected sub-watersheds, technical assistance was provided to the planning bodies of local governments to coordinate inter-sectoral actions with the demands of grassroots organizations and with non-governmental initiatives in general.

Involving the private sector: In areas where the private sector was found to be a significant stakeholder, representatives of corporations and companies were asked to join the participatory and integrated watershed management process.

Legal recognition of VDCs and user groups: In accordance with local laws and regulations, the project supported user groups and VDCs in acquiring legal status. However, in actual practice, none of these organizations got themselves registered.

Conflict management: During the implementation of the above activities, at times, the project teams had to mediate conflicts among communities and institutions or within the local administration.

Methodological Aspects of People's Participation

The government polices began to emphasize people's participation in development programmes during early 1990s. The panchayati raj institutions were given a constitutional status with the 73rd and the 74th constitutional amendments. The panchayats are given many more powers, apart from the setting up of reservations for the disadvantaged sections of women and low castes. In order to ensure local people' participation in development programmes; the most readily available institution was the gram panchayat. Nonetheless, IWDP (Hills-II), Jammu and Kashmit have formed separate committees in order to operationalized participatory watershed management. The panchayats are statutory bodies, whereas the VDCs are informal bodies and have no legal standing. After the panchayats were given a constitutional status, various development polices gave directions about involving the panchayats at different stage. However, when actually seen in the field, the link is weak and in many cases, as good as non-existent. Many users committees have a very poor relationship with the panchayats. Sometimes villagers see panchayats and users committees as competing alternative forms of organization. At the initial stages of the phase second of IWDP (Hills), the panchayats were non-existent in the State of Jammu and Kashmir. The elections for panchayats took place later in the year 2001. Besides, the view of the project functionaries towards panchayats is also

very clear. The panchayats are elected bodies, and although supposed to be representative of the people, don't remain so in reality. The panchayats are supposed to be non-political, but these are influenced by party politics, which does not allow for a fair representation of village interest. Hence, the need for the formation of separate watershed committees at village level has been emphasized. A structure parallel to the panchayats is also necessary, as it gives scope to the project functionaries to have parameters of their own choice in the membership and the executive body, addressing issues of equity in particular. Not only this, the government departments do not have any control over the expenditure of funds made by panchayats. Not trusting the panchayat system, the project officials want to have control over the disbursement and expenditure of money by creating parallel participatory institutions.

VDC Formation and People's Participation

The first step in organizing collective action is defining the boundaries of the CPRs and specifying those authorized to use it [Ostrom (1990)]. However, simply defining the resource boundaries and identifying the users is not enough. It is possible for a limited number of the appropriators to increase the intensity of resource use, so that they may totally destroy the resource. As such, the role of user groups in resource management is not overemphasized. PRAs reveals that IWDP (Hills-II) project functionaries along with local resource users conducted a walk through survey of the villages included in the sub-watersheds to identify the degraded village common lands (VCLs), forestlands, and grazing lands to be enclosed for protection and regeneration. Special attention has been paid to include the women, landless, and disadvantaged in the user groups. The rural poor have a greater dependency on CPRs for livelihoods and thus their representation on user groups has been assured through positive discrimination. There have been wide variations in the size of villages (72 to 500 households) in which VDCs have been formed. VDC comprises a group of about 10-25 villagers from each of the villages. The participatory social development functionaries in the presence of village communities have formed the VDCs through adopting the

process of selection of the members of VDCs, keeping mandatory gender and disadvantaged groups' representation into account (See table 2.1). In none of the case, the VDC has been formed either by election or by nomination of the project functionaries.

The members of the VDC represent specific socio-economic classes within the community. The family background, experience, sobriety of behaviour, sense of tolerance, quality of impartiality and proven honesty appears to be the predominant consideration for the selection of VDC members across the selected sub-watersheds. In some cases, the possession of landholding has also been given consideration for selection of members to VDCs. Even though in a large number of cases, the relatively elderly persons or middle-aged persons were selected to VDCs, in some cases, although not many in number, persons of relatively younger ages were returned to these committees. In the forested sub-watershed of Ramnagar, more than 70 per cent of the VDC members reported that experience, family background, sobriety of behaviour, sense of tolerance and quality of honesty were the dominating factors in their selection on VDC. Whereas in agricultural sub-watershed, more than 80 per cent of the members of VDC reported that the qualities of tolerance, impartiality, honesty and sobriety of behaviour were taken into consideration in getting the members selected to the VDC. Similarly, in Akhnoor sub-watershed, honesty (in case of more than 80 per cent) of the member was given main consideration in selecting a member to VDC, in both the forested as well as agricultural watersheds.

During PRAs, it was found that all the members of VDCs were not perceptible and receptive of project activities. The young members bubble with excitement and in many times tend to ignore the virtues of humility and healthy cooperation with development functionaries. The user groups, which had been formed, were not necessarily represented in the VDC. Thus, they may be unable to directly influence the decision making process in terms of the activities of the VDC. However, the experience gained in-group formation is very valuable. They should be the building blocks of the farmers' organization or VDC. More than 77 per cent of the VDC members across the selected sub-watersheds reported that

membership procedure was rigid. Guidelines need to be framed for enabling those who remained non-members in the beginning to join later on. While the early members have every right to demand that late joiners should pay in some form of the effort the former have already invested, VDC should be discouraged from believing that they can permanently exclude non-members from access to the resources. It is ironical to note that not even a single VDC has been registered. However, the lists of the members exist on the records of VDCs and IWDP officials. The main reasons for non-registration of VDCs with appropriate authorities were reportedly lack of legal knowledge and cumbersome procedure involved in the process of registration. As a result, all of the sampled VDCs have not initiated the process of registration (See table 2.1). A large proportion of the VDC members across the selected sub-watersheds reported that VDC has not been got registered due to lack of legal knowledge and cumbersome procedure. It is significant to note that in none of the VDC, factors like internal conflict and/or non-cooperation from the project/registration authorities have played a part in non-registration of the VDC.

Table 2.1: VDC Formation and People's Participation

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Process of VDCs Formation	No.	%	No.	%	No.	%	No.	%
Selection	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Main Consideration for Selection/ Election								
Age	13.00	48.14	11.00	57.89	22.00	66.60	6.00	54.54
Experience	24.00	88.88	14.00	73.68	25.00	75.75	8.00	72.72
Land Holding	11.00	40.74	9.00	47.36	19.00	57.57	5.00	45.45
Family Background	22.00	81.48	11.00	57.89	21.00	63.63	7.00	63.63
Sobriety in Behaviour	21.00	77.77	16.00	84.21	23.00	69.69	8.00	72.72
Sense of Tolerance	17.00	62.96	19.00	100.00	25.00	75.75	9.00	81.81
Quality of Impartiality	14.00	51.85	18.00	94.73	26.00	78.78	6.00	54.54
Quality of Honesty	21.00	77.77	18.00	94.73	28.00	84.84	9.00	81.81
Membership Procedure								
Rigid	21.00	77.77	15.00	78.94	27.00	81.81	9.00	81.81
Can't Say	6.00	22.22	4.00	21.05	6.00	9.29	2.00	18.18
Strength of VDCs								
Between 10-15	27.00	100.00	0.00	0.00	12.00	36.36	11.00	100.00
Between 15-20	0.00	0.00	19.00	100.00	0.00	0.00	0.00	0.00
Between 20-25	0.00	0.00	0.00	0.00	21.00	63.63	0.00	0.00
Legal Status of VDCs								
Unregistered	27.00	100	19.00	100.00	33.00	100.00	11.00	100.00
If Unregistered, Why?								
Lack of Legal Knowledge	21.00	77.77	11.00	57.89	19.00	57.57	7.00	63.63
Cumbersome Procedure	22.00	81.48	12.00	63.15	24.00	72.72	6.00	54.54
Not Initiated the Process	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00

The membership procedure was reportedly rigid in most of the cases in both the forested as well as agricultural sub-watersheds. It is significant to note that no

change in VDCs membership has taken, once the VDCs were formed by selection. It has also been noticed that educated traders with little or no land have dominated the VDCs in forested sub-watershed of Ramnagar. However, the interested landless and poor farmers were not accommodated in VDCs, whereas, in agricultural sub-watersheds of both Ramnagar as well as Akhnoor, the landless and near landless villagers have been given representation on VDCs. During PRAs, it was revealed by some of the members in agricultural sub-watershed of Ramnagar that their names have been incorporated in VDC's list, but they don't know the purpose of such an inclusion. PRAs confirm that a new type of leadership has come to dominate the stage at the village level in the form of VDCs. The poor farmers and agricultural labourers, including the disadvantaged groups have very much come to the forefront, but the large landowners and educated traders were dominating the VDCs.

Women Participation in Watershed Management

Along with the project-implementing agency, it is the VDCs and user groups that are responsible for planning and decision-making in watershed development projects. Most of the women are unaware of the role they can play in watershed development projects. Project implementing agency efforts to involve women are often limited to awareness camps, or explanations of the concept of watershed development in women's meetings. One of the main objectives of these camps and meetings was to enforce the ban on free grazing and open access to CPRs. Given the prevailing socio-cultural constraints, it is only exceptionally strong women who are be able to make themselves heard under such circumstances. Furthermore, single woman, or even two, may find it difficult to represent the interests of all women in the village. Although women in general can be divided into two broad groups, landed and landless, there will be different needs and priorities within these groups depending on the occupations and socio-economic groups. Women from lower status-households were more interested in watershed protection activities since these directly affected their access to CPRs.

Women from large landholding-households were less interested, as they were not directly affected by restrictions on CPRs.

One of the positive effects of the involvement of the users in project activities by forming VDCs is the increasing visibility of those groups who hitherto had not been expected to enter the public arena on equal terms. If we limit ourselves for the present to women, the record of VDCs is rather disappointing in active participation. The majority of the women VDC members were found in the age group of 30-45 with poor educational attainment. It is ironical to note that none of the women VDC member was educated above middle standard. Besides, their participation in VDC has been reportedly veiled and passive. Thus, their representation on VDC is reported as marginal and may be too restricted to facilitate the dynamic and vibrant participation of all the stakeholders (See table 2.2). PRA reveals limited, often symbolic participation of women in the VDC. Out of six VDC selected for the present study, only two (one each in forested watershed (Dehari) and agricultural watershed (Chohara) had significant involvement of women, due to their participation having been facilitated by participatory social development functionaries. In other VDCs, 2-3 women have been made members of the managing committee. By and large, women remain outside the participatory process. As women are often the largest single group of resource users, their absence from VDC decision-making has often resulted in their priorities remaining unheard and the negative impact of increased labour and time required for water, fuel-wood and fodder collection. This applies particularly to women of the poorest households with no private property resources to fall back upon when forest areas are closed or certain types of usage are forbidden. It has been observed that a few women were aware about the existence of VDC in their villages and their functioning. This is not an issue of gender equality alone but may also have a critical impact on the sustainability of both the VDC and participatory watershed development and protection, without which the programme objectives will only remain rhetorical.

Table 2.2: Women Participation in Watershed Management								
	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	No.	%
Women Participation in VDCs								
Age Group (years)								
Below 30 Years	2.00	7.40	0.00	0.00	0.00	0.00	2.00	18.18
30-45 Years	3.00	11.11	3.00	15.78	3.00	9.09	1.00	9.09
Above 45 Years	2.00	7.40	0.00	0.00	1.00	3.03	0.00	0.00
Education								
Illiterate	2.00	7.40	2.00	10.52	1.00	3.03	1.00	9.09
Middle	5.00	18.51	1.00	5.26	3.00	9.09	2.00	18.18
Nature of Participation								
Veiled/Passive	4.00	14.81	3.00	15.78	4.00	12.12	1.00	9.09
Unveiled/Active	3.00	11.11	0.00	0.00	0.00	0.00	2.00	18.18

The mandatory requirement of at least one woman, or an adequate number of women on VDCs and user groups encourages their participation but does not demonstrate a committed effort to involve women in decision-making. For effective participation, it is essential that at least one-third, preferably one-half, of the committee should consist of women. Furthermore, female committee members need to be given specific responsibilities and made signatories to the bank account for the project, in order to emphasis the importance of their role. As a first step towards strengthening the involvement of women in decision-making, the objectives of the project implementing agency and the plans for intervention in the watershed should be made available to women in the community from the beginning of the project. Watershed plans are usually presented by the project-implementing agency through the gram sabha and it is therefore essential that full participation of women in these meetings be attained. This can be achieved by specifying that the unit of participation is the individual adult and not the household. Sensitive scheduling of the time and location of the meeting can also encourage attendance by the poorest women in the community.

Women who want to participate in community activities can do so only after completing their household duties and other work-whether it is in their own fields or outside employment. Participation in community activities therefore becomes the third work burden of women. On the one hand, we recognize that women can make significant contributions to community development and expect them to participate. At the same time, we criticize them for not attending meetings and for their inability to take off from their domestic responsibilities to participate in

community activities. Facilitating women's participation begins with understanding the community in which the watershed activity is to be undertaken. Gender roles, responsibilities and gender based division of tasks in the household and community need to be analyzed before planning any development activity. Although certain socio-economic generalizations can be made, each community will be unique in terms of specific norms and relationship. Watershed development projects depend on community action and it is important, therefore, to understand each individual community before any attempt can be made to overcome social and cultural barriers.

If decisions related to onwerhsip, access and control of productive resources remain exclusively in the hands of the men, it is unlikely tha women will receive a fair share of benefits. Efforts must be made to improve intra-household distribution of benefits through community projects. CPRs not only meet daily household needs for fuel and fodder, but also provide livelihood options for women. Although CPRs remain heavily degraded in many areas, the imposition of accessing restriction on common and forestland has led to successful regeneration of the resource in watershed development areas. Women, however, rarely benefits from this regeneration, mainly because they are unable to pay, for rights to cut and carry fuel and fodder. As a result, many women have been forced to reduce or sell their livestock. Furthermore, women have to go further failed to fetch fuelwood, increasing the time spent in collection. Only women from land-owing families who have benefited from irrigation are able to use gas or kerosene stoves as a substitute for the lack of access to fuelwood. Similarly, when water becomes available, it is men-specifically landowners-who tends to assume control over the resource. Water resources developed through community enterperise should belong to the community as a whole and logically, women should be made equal partners in the management of these resources. Watershed development projects are, therefore, taking away livelihood options from women and increasing the drudgery involved in accessing fuel, fodder and water. It is important that project-implementing agency should develop mechanisms to enable the women a wider sharing of benefits. Where CPRs are

concerned, women can be given rights over village common and forestland to access the resource they need for their livelihoods. The project can provide infrastructural support to record and confer user rights to these resources. It can also help set up systems-such as social fencing or rotational grazing – to ensure that women do not completely loose their access rights to CPRs.

VDCs and Decision Making in Watershed Management

Every VDC has convened monthly meeting as a routine affair to discuss the problems confronting watershed development and protection. In some cases, fortnightly meetings of Executive Committee (EC) also took place to discuss the pertinent issues. In most of the cases, the decisions have been taken by majority vote, although cases were also reported where influential members got their decision enforced. Some cases have also been reported where decisions have been taken at the behest of IWDP field functionaries, which ranges between 21 per cent to 45 per cent, the lowest in forested sub-watershed of Ramnagar to highest in agricultural sub-watershed of Akhnoor (See table 2.3). The EC was authorized to take decisions on behalf of the VDCs' members, whereas only the general body took some pertinent decisions. However, the working of the VDCs and ECs were reportedly not very transparent. In the agricultural sub-watersheds of Ramnagar as well as Akhnoor, more than 60 per cent of the VDC members reported that the ECs have played a greater role in decision making related to watershed management. The rules entrusting duties and responsibilities to the members of VDCs and ECs have been strictly complied with in most cases. In the sub-watershed of Ramanagar, 10 per cent of the VDC members reported that important decisions regarding watershed management were taken only in the general body, whereas in Akhnoor sub-watershed, such proportion are as high as 21 percent. The functioning of the VDCs was reportedly not very transparent.

Table 2.3: VDCs and Decision Making in Watershed Management

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	No.	%
Timings of Meetings of VDCs								
Fortnightly	9.00	33.33	0.00	0.00	3.00	9.09	2.00	18.18
Monthly	18.00	66.66	19.00	100.00	30.00	90.90	9.00	81.81
Decision-Making by VDCs								

jority Decisions	13.00	48.14	12.00	63.15	25.00	75.75	6.00	54.54
Minority Decision	3.00	11.11	0.00	0.00	0.00	0.00	0.00	0.00
Dictation by Influential	7.00	25.92	3.00	15.78	0.00	0.00	0.00	0.00
Unanimous	3.00	11.11	0.00	0.00	0.00	0.00	0.00	0.00
Imposed by IWDP Authorities	7.00	25.92	4.00	21.05	8.00	24.24	5.00	45.45
Basis of Decision Making								
Authorization to Executive Committee	16.00	59.25	14.00	73.68	21.00	63.63	9.00	81.81
Bye-Laws Specifying Duties and Responsibilities	18.00	66.66	19.00	100.00	30.00	90.90	9.00	81.81
Important Decisions by General Body	3.00	11.11	2.00	10.52	7.00	21.21	2.00	18.18
Transparency	8.00	29.62	3.00	15.78	5.00	15.15	0.00	0.00

In the forested sub-watershed of Ramnagar, 29 per cent of the VDC members reported transparent working of the VDCs, whereas in agricultural sub-watershed, only 15 per cent reported transparent working of their respective VDC. More or less similar is the situation of forested sub-watershed of Akhnoor, whereas in agricultural sub-watershed none of the VDC members reported VDCs' functioning as transparent, which is really a cause of concern. The robustness of a participatory institution is reflected in the extent of the identification of its general body of members with the institutions and the latter's capacity to take up activities of common interest. Only two (one each in forested watershed (Dehari) and agricultural watershed (Chohara)) of the 6 VDCs selected during the course of the present study had developed some self-governing traits of this nature. The livelihood needs of the disadvantaged had been over-looked, which have resulted in their further marginalization due to the less visible and subtle processes of exclusion, delegitimisation of their traditional resource use patterns, and emphasis on monetary and wage incentives rather than making existing resource based livelihoods more sustainable.

Nature of Participation in Watershed Management

PRA exercises revealed that with the formation of VDCs, community involvement in watershed development and protection has increased significantly, which have resulted in social mobilization and confidence building among the rural community. VDCs have implemented demand driven activities on priorities within the framework of the project design. The participatory social development functionaries have created the much needed awareness among the local community regarding sustainable management of natural resources, for which local stakeholders have been empowered through capacity building programmes to inculcate the habits of self reliance and sustainability of the assets created

through project interventions. The idea of participatory decision-making has been appreciated and operationalized by the members of VDCs for which regular meetings were organized and pertinent issues confronting the village have been discussed. None of the VDC has played any role in fund management such as checking and allocation of funds for watershed development activities. The VDCs in forested as well as agricultural watersheds in Ramnagar and Akhnoor were found actively engaged in framing and execution of the development schemes, management of CPR resources, maintenance of assets created through project interventions, solving internal conflicts, if any. For example, asset maintenance (85.18 per cent) followed by interaction with project functionaries (81.48 per cent) were reportedly the main activities of the VDC members in forested sub-watershed of Ramnagar, whereas creation of SHGs was reportedly the dominant activity of VDC members in forested sub-watershed of Akhnoor. In the agricultural sub-watersheds, asset maintenance and fund raising from the project was reportedly the dominant VDC activity in Ramnagar as well as Akhnoor. VDC members were also helping the participatory social development functionaries in resource conservation activities, for which Village Development Plan (VDP) has been framed in each of the selected village (See table 2.4).

VDCs have been responsible for preparation of Village Development Plan (VDP) on the basis of demands and priorities put forward by the village communities. After the preparation of VDP, a general Memorandum of Understanding (MOU) has been signed with the President and Secretary of the VDC, which highlights the roles and responsibilities of the VDC as well as the project staff. The MOU has also been signed before the execution of work of each activity between VDC, user groups and the team leader (Chief Executive Officer) of the sub-watershed. The content of the MOU reads like: cost of contract, disbursement of funds/release of payments, completion time, maintenance of accounts, dispute settlements, duties and responsibilities of respective parties, details of cost sharing vis-à-vis beneficiary contribution, undertaking for maintenance and sustainability, and benefits sharing of the assets created.

PRA exercises revealed that VDPs preparation has been done in a cursory manner, and the means to meet their priorities are often unrealistic. The project functionaries along with VDCs and user groups have relied heavily on available secondary data sources for the preparation of VDPs, and PRA exercises have been attempted in ritualized way with little relevance to preparation of the VDPs. No doubt, project functionaries have invested a lot to time and effort in preparing the VDPs. These are fairly lengthy and elaborate documents. The sheer length and bulkiness of the documents is, however, itself a problem. Most of the members of VDCs and local stakeholders have not been fully informed about their contents. The preparation of the plans does not include systematic consultation with diverse resource user groups. As the VDPs are prepared mostly by the inputs from the project functionaries, the approval of these is sought only from the members of the executive committee of VDCs, prior to getting them singed as a part of the MOU. This is a highly undesirable practice.

Table 2.4: Nature of Participation in Watershed Management by VDCs

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Nature of Participation by VDCs	No.	%	No.	%	No.	%	No.	%
Holding Meeting	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Framing of Development Schemes	19.00	70.37	9.00	47.36	26.00	78.78	5.00	45.45
Execution of Development Schemes	18.00	66.66	11.00	57.89	21.00	63.63	6.00	54.54
Management of CPRs Maintenance of Asset Created	16.00	59.25	12.00	63.15	15.00	45.45	7.00	63.63
Maintenance of Asset Created	23.00	85.18	14.00	73.68	17.00	51.51	9.00	81.81
Solving Internal Conflicts	16.00	59.25	13.00	68.42	18.00	54.54	6.00	54.54
Raising Funds for Development from IWDP Authorities	14.00	51.85	12.00	63.15	13.00	39.39	8.00	72.72
Creation of Self -Help Group	21.00	77.77	13.00	68.42	23.00	69.69	5.00	45.45
Interaction with Political Institutions / Social Groups /IWDP Authorities	22.00	81.48	14.00	73.68	14.00	42.42	7.00	63.63
Monitoring	18.00	66.66	12.00	63.15	15.00	45.45	4.00	36.36
Evaluation	15.00	55.55	7.00	36.84	13.00	39.39	3.00	27.27

The project functionaries must ensure that all villagers, both VDC members and non-members as well as user groups, are fully aware of the VDP contents and find them acceptable, before asking a VDC representative to sign it on their behalf as a legally binding document. Non-members need to be equally informed as they also have legal rights in watershed resources. At the same time, VDP must include viable alternatives in time and space for all those currently dependent on watershed resources proposed to be closed to grazing and extraction; the resource poor groups cannot wait for several years to be able to satisfy their daily consumption needs. For this, micro planning must incorporate an analysis of the differing, often conflicting, needs and priorities of

different socio-economic groups. This must include an analysis of gender differences in resource use, and must ensure that the resource needs of poorer women and disadvantaged resource users are adequately addressed. In the longer term, VDP should aim to reduce gender differences in work burden as well as access to resources.

System of Financial Management

The system of financial management adopted by the VDCs has not been reportedly satisfactory. In forested sub-watersheds in Ramnagar and agricultural watershed of Akhnoor, 81 per cent of the VDC members reported that joint bank accounts were opened, whereas in the agricultural sub-watershed of Ramnagar, only 36.84 per cent of the VDC members reported opening joint account for fund management. VDCs were supposed to maintain record of all transactions. However, the project was reportedly playing a major decisive role in utilization of funds and keeping the records of all transactions in the name of VDCs. For instance, only 42 per cent of the VDC members in agricultural sub-watershed of Ramnagar reported that their respective VDCs maintained the record of all transactions. PRAs revealed that even the President and Secretary more often were made just a signatory on financial documents and project functionaries performed the key roles. The financial matters were discussed in the VDC meeting and the system of internal audit was put into practice in a few VDCs. No attempt has been made in any of the sampled sub-watersheds for fund mobilization from the community and use of savings from the sale of usufructs share for VDCs' fund capitalization. In a few cases, there has been system of provisioning of credit to the members out of accumulated VDC fund. However, in practice, this has not been operationalized due to poor fund accumulation. VDCs have also been given autonomy in utilizing the available funds (See table 2.5), but such provisions were impracticable due to non-availability of funds with them. The project has provided funds for resource conservation and protection activities and these funds were utilized specifically on planned activities. No

diversion of funds was allowed under any circumstances, except the permission of project implementing agency at sub-watershed level.

Table 2.5: System of Financial Management adopted by VDC

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
System of Financial Management	No.	%	No.	%	No.	%	No.	%
Joint Bank Account	22.00	81.48	7.00	36.84	25.00	75.75	9.00	81.81
Keeping Record of Transactions	18.00	66.66	8.00	42.10	28.00	84.84	8.00	72.72
Discussion in VDCs Meeting	13.00	48.14	15.00	78.94	14.00	42.42	7.00	63.63
System of Internal Audit	14.00	51.85	12.00	63.15	17.00	51.51	4.00	36.36
Provision of Giving Credit to Member	12.00	44.44	7.00	36.84	15.00	45.45	4.00	36.36
Autonomy in Utilizing Funds	15.00	55.55	12.00	63.15	16.00	48.48	5.00	45.45

Interaction of VDC with Project Functionaries

At present, there is lack of development of more balanced partnerships between IWDP functionaries and VDCs, which is reflected in the imbalance in power and control between IWDP and VDC. The responsibility for maintaining VDC accounts, convening its meetings and preparing the village development plans, powers of dissolution and conflict resolution is largely held by project field functionaries. Thus, instead of the VDCs' executive committees (ECs) being accountable to the general body to assure democratic and responsive functioning of the VDCs, they are instead, accountable to project field officers. This defeats the very purpose of participatory watershed management. VDCs have interacted with project functionaries with regard to the types of schemes to be undertaken, developing norms and executing project interventions (See table 2.6). In the forested sub-watershed of Ramnagar, more than 80 per cent of the VDC members reported that they interacted with the project functionaries with regard to types of activities to be implemented and maintenance of the assets created by the project. In the agricultural sub-watershed, 84 per cent of the VDC members interacted with project functionaries regarding training. In the forested sub-watershed of Akhnoor, more than 70 per cent of the VDC members interacted with project functionaries on types of activities, manpower assistance, training, and CPR management. Whereas in agricultural sub-watershed, about 81 per cent of the VDC members interacted with project functionaries on maintenance of assets created followed by training (72.72 per cent) and executing development schemes (63.63 per cent). On the whole, VDCs have played a useful role in the maintenance of assets created, although their

participation in the supervisory work might have remained limited, but these must have brought about the motivation among the villagers to collectively safeguard the assets created for their benefit. It is significant to note that some of the basic features of sustainable participatory institutions have not been taken care of and no attempt has been made to explore the ways and means for fund capitalization by the VDCs. The poor villagers have not contributed in any form to provide technical assistance in project interventions due to inadequate capacity building. However, whatever and wherever possible, the VDCs have contributed in the form of arranging local manpower support, may be hired or voluntary, but mostly, the hired labour, because of poverty, the voluntary labour contribution was very small. VDCs have also sought IWDP help in solving internal conflicts over usufruct sharing, contract assignment to members of EC, etc.

Table 2.6: VDCs Interaction with Project Functionaries

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
VDCs Interaction with Project Functionaries			No.	%	No.	%	No.	%
Types of Schemes to be Undertaken	22.00	81.48	12.00	63.15	24.00	72.72	4.00	36.36
Developing Norms	18.00	66.66	12.00	63.15	22.00	66.60	5.00	45.45
Executing Developmental Schemes	13.00	48.14	9.00	47.36	14.00	42.42	7.00	63.63
Manpower Assistance	15.00	55.55	9.00	47.36	24.00	72.72	5.00	45.45
Training Component	22.00	81.48	16.00	84.21	25.00	75.75	8.00	72.72
Supervision	17.00	62.96	12.00	63.15	23.00	69.69	5.00	45.45
Management of CPRs	14.00	51.85	11.00	57.89	25.00	75.75	5.00	45.45
Maintenance of Asset Created	23.00	85.18	14.00	73.68	17.00	51.51	9.00	81.81
Solving Internal Conflicts	16.00	59.25	13.00	68.42	18.00	54.54	6.00	54.54

Interaction of VDCs with Other Agencies

One of the purposes of VDC creation was to encourage forward and backward linkages between the villagers and the development agencies. It, therefore, makes it imperative that the VDCs wherever existing should have cultivated healthy linkage with development agencies operational in the area. This had considerable significance in making VDCs vibrant agents in focussing on the problems faced by the beneficiaries and act as catalysts of change in the rural areas. VDCs have interacted with local NGOs on the issues like organizing, initial guidance and capacity building (See table 2.7), which have been facilitated by the project. They never discussed the financial issues like fund raising, maintenance of proper accounts, etc. with local NGOs, which may be due to poor financial base as well as capacity building on the part of local NGOs to assist the

VDCs in this regard. In forested sub-watershed of Ramnagar, more than 70 per cent of the members reported that they interacted with NGOs on the issues such as organizing, initial guidance and capacity building. Whereas, in the agricultural sub-watershed, about 63.15 per cent, 47.36 per cent and 68.42 per cent of the VDC members reportedly interacted with local NGOs on such issues. Likewise, in the forested sub-watershed of Akhnoor, about 78.78 per cent, 45.45 per cent and 39.39 per cent of the VDC members interacted with NGOs for capacity building, organizing and initial guidance. In agricultural sub-watershed, only 54.54 percent and 36.36 per cent of the VDC members reportedly interacted with NGOs on such issues. A large proportion of the VDCs have open account in the banks to operate the development funds allocated to undertake resource conservation and protection activities. However, they never approached the banks for other purposes such as raising of the funds for income generating activities through creation of SHGs. None of the VDCs have registered themselves with appropriate authorities, as such they have not interacted with panchayats on issue of registration. VDCs have interacted with panchayats for availing of watershed development schemes and sought their assistance in this regard.

Besides above, VDCs have interacted with local traders and contractors for developing marketing links as well as repairs and construction of irrigation distribution channels, water harvesting structures, forest enclosures, soil conservation structures, etc. VDCs have also been involved in conflict resolution and forging of linkages with administrative, developmental and political agencies. In none of the case, police intervention was sought, as the conflicts are resolved at local level with the mediation of the panchayats and local leadership. The VDCs are often more concerned with non-resource issues, but there is no blending of the project with panchayats and other line departments. The present linkages between IWDP (Hills-II) and other line departments are weak and need strengthening, if the VDC have to emerge as the focal points for all round watershed development. There is urgent need to form suitable links with government and non-government agencies, which provide

alternative/supplementary social and economic programmes with the potential to provide additional or alternative incomes and livelihoods for rural people.

Table 2.7: Interaction of VDCs with Other Agencies

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Interaction with Other Agencies	No.	%	No.	%	No.	%	No.	%
NGOs								
Organizing	23.00	85.18	12.00	63.15	15.00	45.45	4.00	36.36
Initial Guidance	19.00	70.37	9.00	47.36	13.00	39.39	4.00	36.36
Capacity Building	21.00	77.77	13.00	68.42	26.00	78.78	6.00	54.54
Banks								
Open Account	25.00	92.59	16.00	84.21	31.00	93.93	9.00	81.81
Village Panchayat								
Availing of Watershed Development Schemes	24.00	88.88	14.00	73.68	30.00	90.90	9.00	81.81

Social and Economic Dimensions of Participation: Factor Analysis

The responses of the VDC members provide the necessary information for estimating their role and strategies at the VDC level. The random sample consists of 90 VDC members in three VDCs each selected from sub watershed of Ramnagar and Akhnoor. A factor analysis, which is a method for translating a large set of variables into a few independent choice variable, separates participatory indicators into a set of principal components, known as factors. Each factor represents an independent choice. As a rule of thumb, variables with a coefficient in absolute value above 0.5 are said to be dominating in a factor. Another rule of thumb is that all factor with a value larger than one should be used in the analysis.

Table 2.8 shows the results for forested and agriculture watershed separately in the sample area. The factor analysis yields two factors viz. social and economic in forest and agricultural watersheds. The social and economic factors tell us the dimensionality of participation in Ramnagar and Akhnoor separately for forested and agricultural watersheds. A perusal of data presented in table 2.8 make it clear that in case of forested and agricultural watersheds of Ramnagar, the dominating variables in social factor are all related to VDC members' attitude towards the meeting, which explain respectively 42% and 33% of the variations. This is typically a social aspect of participation. The dominating variable in economic factor, which explain 14% and 10% of variations respectively in forested and agriculture watersheds, express contribution to and benefiting from

participation as well agreement to decisions. The interest to attend the meetings and purpose it serves to the participant has again a high factor loading. While economic consideration is important, two participatory indicators related to meetings are also dominant. These two participatory indicators relate to the acceptance of the meetings, whether they are conformed themselves to the discussion in the meetings. The economic factor represents VDC members' perceived economic benefits and contribution and their acceptance of the institutional arrangement. This shows that participation in watershed management in Ramnagar consist of two dimensions.

In the case of sub watershed of Akhnoor, the dominating variables in the social factor, which explain 44% of variations in forested watershed are all, related to people's participation in evaluation and decision making which typically symbolizes social choice. It also symbolizes the acceptance of institutional arrangement in the forested watershed. The dominating variable in economic factor, which explains 11% of variation, express people's contribution to the VCL pool, which typically symbolisms an economic choice. The economic factor is also dominated by the importance of meetings and almost negatively dominated (factor loading - 0.24) by the frequency of meetings. This means that people who consider the meetings to be important also believe that the meetings are not held frequently; it is the reflection of VDC members who are quit pessimistic about the present practice of local institutional arrangements to manage watershed resources.

It is significant to note that negative indicators of participation are quite high in agricultural watershed of Akhnoor, but not dominating, supporting the statement of a negative attitude that is reflected in economic factor. This mean that the person who gain from participation and contribute more to VDC, perceive the meetings as in-frequent; they also are quite negative about their possible influence on the VDC as indicated out by negative participatory indicators. In brief, the factor analysis shows that participation in the selected sub-watersheds is two-dimensional. In the social factor, all co-efficient that are related to meetings dominates. In the economic factor, the co-efficient that are related to

economic aspects of participation dominate. On the combined level, we see a clear division of the participatory choice into two components where social considerations are most important, economic considerations constitute the second main important considerations.

The following analysis explains the conditions under which a person is most likely to participate in watershed management. The links between several socio-economic variables and participation are found with the help of multiple regression analyses. The table 2.9 shows the general patterns for institutional settings in sub-watersheds of Ramnagar and Akhnoor. The following equation is estimated:

$\theta = \alpha + \beta 1\ RES + \beta 2\ VCLDEP + \beta 3\ AVAGE + \beta 4\ EDVS + \beta 5 CASGR +$ error

Where

θ is the level of participation;

α is a constant; and

$\beta 1$ is the coefficient of a socio-economic variable.

RES: Level of resources, based on the principal component of three indicators, present quality, change in quality, and availability of resources.

VCLDEP: Dependence of village common land (VCL) – total use of VCL resources like fuelwood, fodder, etc. divided by total need for per family.

AVAGE: Average age in the family.

EDUS: Years pf schooling of the respondent.

CASGR: Caste group (higher number means a lower caste).

Table 2.8: Grouping of Participatory Indicators into Principal Components

Level of Participation	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Factor	Social	Economic	Social	Economic	Social	Economic	Social	Economic
Planting in VCLs	0.376	0.054	0.138	0.034	0.284	0.082	0.324	0.018
Contribution to VCL pool	0.234	**0.572**	0.218	**0.611**	0.168	**0.631**	-0.134	**0.586**
Benefiting from VCL pool	0.091	**0.786**	0.068	**0.672**	0.082	**0.576**	0.076	**0.541**
Ability to use VCL pool	0.076	**0.682**	0.052	**0.584**	0.068	0.112	0.034	**0.518**

Benefits from using VCL pool	0.162	**0.732**	0.098	**0.682**	0.098	*0.432*	0.132	0.389
Importance of meetings	**0.632**	0.084	**0.584**	0.064	**0.092**	0.621	0.612	0.132
Agreements with decisions	0.052	**0.832**	0.048	**0.756**	**0.658**	*0.482*	0.076	*-0.448*
Attendance of meetings	**0.789**	0.162	**0.686**	0.14	**0.762**	0.184	**0.548**	-0.172
Ability to influence decisions	**0.672**	0.376	**0.598**	0.352	**0.252**	0.286	**0.732**	-0.192
Frequency of the meetings	**0.786**	0.018	**0.734**	-0.018	**0.688**	-0.024	**0.724**	-0.018
Interest in meetings	**0.681**	**0.521**	**0.612**	**0.548**	0.784	0.234	0.186	-0.098
Gain from meetings	**0.638**	**0.541**	**0.584**	**0.612**	**0.611**	0.023	**0.538**	**0.542**
Suggesting in meetings	**0.623**	0.335	**0.608**	*0.414*	***0.442***	0.372	**0.514**	0.292
Percentage of variance explained	42.20%	13.60%	32.60%	10.30%	43.60%	11.40%	36.70%	11.80%
Number of observations	27	27	19	19	33	33	11	11
Note: Numbers in bold face denote a dominating indicator (factor loading ≥ 0.5 or ≤ -0.5)								
Numbers in italic face are almost dominating factor (factor loading close to 0.5 and -0.5)								

Besides regression, the descriptive variables are also checked for multi-co linearity by excluding correlated variables. For instance, the education of the respondent is strongly correlated to the average education in the family. The later is therefore excluded in all cases. The adjusted R2 is low (< 0.17) and even negative in those cases where all considered descriptive variables are insignificant. The low R2 is inherent to cross-section data and it is not caused by the sample size, it suffices to interpret linkages with significant t-statistics. The variables that are not significant in the regression equations can also be interpreted, namely, that they do not influence the behaviour of interest as it is described by the dependent variable. The regression outcomes are quite diverse for the institutional settings, but some general patterns are apparent. The level of resources is always positively linked to participation and significantly in eight out of twelve cases. This shows that participation is enhanced when people perceive their resource as being of a god quality. A similar conclusion can be drawn for the forest dependence. This link is also positive in al cases and significantly so in ten out of twelve cases, meaning that high VCL dependence stimulates people's participation in watershed management. Better resources and increased and increased dependency on the common resource lead to a higher level of participation. This suggests that improving levels of common resources strengthens people's participation. A higher level of dependence on common

resources means that people have a higher stake in the VCLs, which is reflected, in their higher level of participation.

Table 2.9. : Links between Socio-economic Variables and Levels of Participation

	Project Area with VDC											
	Ramnagar						Akhnoor					
Participation	Forested WS			Agrl. WS			Forested WS			Agrl. WS		
Factor	Social	Economic	Total	Social	Economic	Total	Social	Economic	Total	Social	Economic	Total
Constant	0.448***	0.486***	0.412***	0.324*	0.136	0.196	0.402***	0.486***	0.372***	0.432**	0.512***	0.517***
	(0.100)	(0.088)	(0.105)	(0.132)	(0.152)	(0.148)	(0.044)	(0.062)	(0.050)	(0.097)	(0.138)	(0.092)
RES	0.0348	0.0042	0.0598	0.0732	0.310**	0.238**	0.136**	0.246***	0.246***	0.188*	0.324**	0.322***
	(0.0676)	(0.0634)	(0.0684)	(0.0812)	(0.100)	(0.088)	(0.043)	(0.060)	(0.050)	(0.072)	(0.112)	(0.092)
VCLDEP	0.225***	0.028	0.186**	0.196*	0.258**	0.322***	0.238***	0.026	0.188**	0.00238***	0.258**	0.328***
	(0.052)	(0.0656)	(0.058)	(0.078)	(0.089)	(0.086)	(0.058)	(0.0622)	(0.064)	(0.00130)	(0.094)	(0.090)
AVAGE	-0.00352**	-0.00038	-0.00289*	0.00106	-0.00296	-0.00126	-0.00348**	-0.00200	-0.00020	0.00044	-0.00020	0.00168
	(0.00128)	(0.00128)	(0.00138)	(0.00188)	(0.00232)	(0.00210)	(0.00132)	(0.00130)	(0.00100)	(0.00088)	(0.00200)	(0.00162)
EDUS	0.00472	-0.00258	0.00336	0.00672	-0.00586	0.00054	0.00503**	-0.00340	0.00348	0.00132	0.00343	0.00760*
	(0.00258)	(0.00284)	(0.00300)	(0.00386)	(0.00454)	(0.00416)	(0.00190)	(0.00250)	(0.00200)	(0.00238)	(0.00402)	(0.00328)
CASGR	-0.0014	-0.0098	0.0084	0.0414*	-0.0098	-0.286	0.0287***	-0.0175	0.0222**	-0.0124	0.0162	0.0272
	(0.0201)	(0.0184)	(0.0211)	(0.0152)	(0.0182)	(0.164)	(0.0072)	(0.0099)	(0.0074)	(0.0161)	(0.0234)	(0.0194)
Adjusted R^2	0.14	-0.04	0.11	0.16	0.15	0.17	0.16	0.04	0.17	0.08	0.07	0.15

Note: The value in the parenthesis is the S.D. *, P < 0.05; **, P < 0.01; * * *, P < 0.001

The indicator of the average age in the family is only (negative) significant in three cases, which implies that younger people in forested watersheds of Ramnagar as well as Akhnoor participate most. When we look at the indicator for education of respondent, two positive significant linkages are found, namely social participation in forested watershed and overall participation in agricultural watershed in Akhnoor, which shows that when education is significant, it stimulates participation, The link between caste and social participation is significant and positive in agricultural watershed in Ramnagar and forested watershed in Akhnoor. In forested watersheds, it tends to be negative, but not significantly so. This shows that people from lower caste in agricultural watershed in Ramnagar and forested watershed in Akhnoor participate more. The same link is also found for the combined sample in forested watershed in Akhnoor. The above analysis shows under which conditions a person is most likely to choose a high level of participation. When the condition of the common resource is good and /or when people are dependent on the common resource,

participation goes up. Low average levels of education in the family and high levels of education of the respondent enhance participation. A high level of people's participation facilitates the initiation of a participatory institution. Once an institution is created, a lower level of participation in needed to keep the participatory process going.

In the context of watershed management, the government takes the first move to rehabilitate the degraded CPRs because they possess the resources. The local people lack the initiative to take the first move, which does not mean that a top-down approach should be followed. The process should commence in those villages where participation is most likely to take place. For instance, the best chances for voluntary participation can be found among the villagers who depend highly on the CPRs and perceive the quality of the forest as good. After initial parformance in watershed management, the successful villages can then serve as an example for other villages to extend the process. Motivated by success in the first stages, resources can be mobilized to replicate the process in villages with less favorable circumstances, hence, the process should not be button-up either, but it should be an interaction between the state and the people, leading to a win-win situation. Transparency of the state and legal rights for the people are important aspects for success as well. In order to improve watershed management practices, people should be given more freedom to act on their own. The state should provide resources and assistance by formally allowing them a share in rehabilitated CPRs. This would enhance the development of the village and the mutual trust between villagers, so that mutual participation can be sustained, by getting closer to the optimal level of watershed development.

Farming System Development Approach and Technology

Though the project focuses on methodological and process-related aspects, technical aspects are also fundamental in participatory watershed management. Greater understanding of the biophysical characteristics of the project area, local traditional know-how and an increased capacity of the project to propose technical solutions are necessary for developing, testing and adapting for

dissemination, more adequate and sustainable technical solutions to existing environmental issues. IWDP has made significant attempts to design and test technical measures for local application and wider dissemination. The consultants have been hired by the IWDP (Hills-II), Jammu and Kashmir to carry out complementary studies in the projectization stage. The participatory development functionaries including female coordinator, facilitators and motivators have been engaged to involve the communities in data collection and analysis, verification or dialogue relating to the planning and design of programmes for watershed development and protection. However, no farming zoning exercises had been undertaken at the sub-watershed level. It seemed that there were likely to be enough differences even in a small watershed of 500-1000 ha to warrant this zoning exercise. There can be a variety of criteria for determining homogenous zones, for example, size of land holding or landless; supplementally irrigated or non-irrigated; slope, soil depth, rainfall, land use, land capability, draft power or no draft power. These criteria can best be decided locally to reflect the specific situation. Such zoning could provide a basis for discussion between watershed teams and the farmers in the search for improvement. Demonstrations could be targeted at areas of specific land capability. The farming system development concept of homogenous zones might also assist in identifying groups of farmers with similar characteristics as a possible aid to building a dynamic farmers' organization.

In the context of watershed development, transfer of technology and integration of indigenous technology knowledge with improved technologies are widely recognized. Under IWDP (Hills-II), the integration of indigenous technology knowledge with modern technological options has received inadequate attention by the technicians and officials responsible for strengthening of farming system technology. The activities involving structural engineering like soil conservation and water harvesting, besides pure vegetative hedges have been implemented. The project interventions seemed to have been concentrated largely on structural methods of soil conservation. Pure vegetative hedges could not be seen in the

field except for those being planted on the conservation structures and field bunding.

The State of Jammu and Kashmir is primarily an agricultural economy and 61 per cent of the work force is depending on agricultural activities contributing over 40 per cent to State Domestic Product (SDP). The state is mostly hilly, crisscrossed by lofty mountains and having low industrial base. The State has a large percentage of population living in far-flung areas, mostly inaccessible, isolated and backward region. The complete dependence on natural vegetation has forced the people to over utilize the natural vegetation, thus resulting in large-scale deforestation. In consistence with the objectives of IWDP (Hills-II), J&K, agricultural component of the project has been contributing largely in achieving economic growth through ecological improvement in selected sub-watersheds. The technical and other inputs provided by the project are summarized as follows:

Provision of fertilizers, improved seeds, pesticides for rainfed demonstration on cost sharing basis; demonstration/training on innovative technologies like agriculture, apiculture, mushroom cultivation etc.;

Demonstration/training especially for women dependent on agriculture as subsidiary occupations;

Continuos surveillance of incidence of disease or pest or any unnatural behaviour of crops by agricultural extension workers; and

Supply of improved implements, seed bins and containers to the beneficiaries.

Most of the poor farmers living in the selected sub-watershed have received these inputs at least once on farm rainfed demonstration. The demonstrations have successfully promoted the introduction of improved varieties, seed treatments, appropriate application of fertilizers and pesticides, agricultural implements and other agronomic practices to ensure moisture conservation. Likewise, horticulture plays an important role in alleviating the socio-economic conditions of the people living in hilly and rainfed areas. The project interventions

under horticulture sector offer bright prospects to increase productivity and employment.

The activities under horticulture sector include:

Rainfed demonstration; supply of plant material, which are draught resistance and versatile adaptability;

Introduction of new varieties and species of fruit plants; rejuvenation and improvement of top working, budding, grafting of existing fruit plants of indigenous type;

Training and demonstration of treatment against diseases; and

Supply of spraying and pruning equipment on cost sharing basis.

PRA exercises revealed that prior to project intervention, the small and marginal farmers were reluctant to use improved technical know-how and used conventional methods of agricultural production. The major impediment in the introduction of high yielding varieties of crops was non-availability of sufficient moisture in the soil at the time of sowing. The various activities related to soil and moisture conservation initiated by the project has encouraged the farmers to go for timely sowing and use of adequate doses of chemical fertilizers. Numerous training camps have been organized to disseminate the scientific technology to the farmers in the selected sub-watersheds. The farmer's exposure visits have also been organized at New Delhi in Krishi Mela, where they had find ample opportunities to interact with farmers from other states. With project interventions, the yields of maize and wheat (two major crops) grown in the selected sub-watersheds have increased significantly as compared with pre-project period and non-project area. In order to increase income from arable and non-arable lands in horticulture sector, fruit plants of improved varieties such as mango, orange, guava, apple, walnut, lime etc. conducive to the climatic condition of the area have been provided to the beneficiaries. The plants of wild kanth, mango, and berry have been found well distributed all over the selected sub-watersheds. Grafting and budding with improved varieties of pear, mango and berry have been conducted to rejuvenate the kanth, mango and wild berry. Despite severe drought, the survival percentage has been reported to be significant and ranges

between 40-85 percent, the lowest for papaya and the highest for anar (pomegranate).

Non-arable lands include Government/forest land, community lands and private lands. These lands have been treated under various components depending upon suitability or topography of the areas. The main component has been afforestation in contour trenches besides other treatments. The progress made under forest and common land during the project period has been significant. Overall yield in the shape of fodder, forage/grasses, fuel wood, and small timber have moderately increased, resulting into increase in milk production, saving of time, higher wool production, healthy cattle, increase in meat production, reduction in soil run-off, increase in moisture regime, low soil erosion, increase in bio-diversity, improved environmental conditions, qualitative wild life habitats, etc. On the whole, the major emphasis of the project appears to be on transfer of technology. Nevertheless, rather limited efforts at the integration of indigenous technology knowledge seem to have been made.

The technicians and officials responsible for the project have utilized techniques of rapid rural appraisal (RRA) or participatory rapid appraisal (PRA) in the preliminary diagnostic activities. However, they do not possess the necessary skills to carry out RRA or PRA. Even in training the farmers little or no time have been allocated to indigenous technology knowledge or its integration with modern technological options, which have rather limited available options even today. Since the soil conservation department dominates the project, there seems to have been concentration on mainly structural methods of soil conservation. Pure vegetative hedges as envisaged in the project could not be observed in the field except for those planted on the conservation structures.

In the selected sub-watersheds, the majority of the farmers are small/marginal and landless farmers. First and foremost, the efforts needs to be on quick income generating activities preferable within a crop season or at most within a year), if people's participation is to be assured and sustained. Only direct and quick benefit generation can ensure the small, marginal and landless farmers' interest in the project. Otherwise the tendency will be to regard the project only in terms

of the possibility for employment. The same is true for efforts to increase women's participation. Women generally do not have time to participate in activities, which bring only long-term benefits, since men generally own these benefits. In the above context, water harvesting/conservation, supplemental irrigation, drinking water, agro-forestry, home gardens, orchards, vegetable growing, chicken, fish, rabbit rearing etc. can become more important in the beginning of the project than soil conservation measures alone. While these efforts are certainly being undertaken in the selected sub-watersheds, they do not appear to be on the same scale as check dams and contour ditches/bunds etc. In the planning surveys, there seems to be no specific mention of understanding and incorporating indigenous technological knowledge into the planning process. This is an important part of the farming system development approach and can often provide a basis for a subsequent point of entry for a planned activity.

Common Property Resource Management

Ostrom (1990) emphasized the importance of appropriation and provision rules for maintenance of CPRs. The appropriation rules deals with restricting time, place, technology, and/or quantity of resource units to be appropriated by the users and are location specific. The resource provisioning rules are influenced by the member's contribution in terms of labour, materials and/or money. The well-tailored appropriation and provision rules helps to account for perseverance of these CPRs. The appropriators' participation in collective choice could be able to devise a good set of rules if they keep the costs of changing the rules relatively low. Agreeing to follow rules ex ante is an easy commitment to make, but actually following rules ex post, when strong temptations arise, is the significant accomplishment. The presence of powerful external authorities that enforce agreement is desirable. However, external enforcement cannot ensure high levels of compliance. The reputation of the appropriators is important especially where individuals share the norm of keeping agreement. Reputation and shared norms are insufficient by themselves to produce cooperative behaviour over the

long run. If they had been sufficient, appropriators could have avoided investing resources in monitoring and sanctioning activities. In all of the long enduring cases, however, active investments in monitoring and sanctioning activities are quite apparent.

During the recent past, a policy decision was made by the Government of India, which made it possible to hand over rights of usufruct on community lands to groups such as village panchayats, or to individuals on request, for appropriate land use. It was observed that this has generally not occurred. The farmers are apparently not willing to use these lands unless they are given land use titles by the revenue department. It seems that in many instances the village revenue officials do not allow the people to harvest the benefits of these lands. Thus, although farmers often encroach upon these lands, they are never put to rational land use (e.g. orchards, pastures, forests, woodlot or other long term use). IWDP (Hills-II) is constraints by the fact that it does not have land use-titling authority, which belongs to the district revenue office only.

Steps Taken by User Groups in Management of CPRs

The project in association with VDCs has created assets through closing degraded forestland, VCLs and constructing water-harvesting structures. The benefits from these assets have started accruing to the population of adjacent areas and transhumance communities. To maintain these assets and ensure benefits sharing, the project in association with VDCs has formed user groups such as water user groups. The constitution, number of members and the method of benefit sharing has been different for each user groups and devised by the group for its sustenance and establishing linkage with VDC. User groups have taken steps in both the forested as well as agricultural sub-watersheds to manage the CPRs. The steps taken by user groups includes developing norms for resource management, providing technical, managerial, supervisory and manpower support, conducting participatory micro-planning and monitoring exercises, besides seeking support of social groups/IWDP authorities/NGOs for the sustainable management of natural resources (See table 2.10).

Table 2.10: Steps Taken by User Groups in Management of CPRs								
	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	No.	%
Steps Taken by VDCs In Management of CPRs								
Developing Norms	17.00	62.96	11.00	57.89	25.00	75.75	6.00	54.54
Technical Support	19.00	70.37	9.00	47.36	24.00	72.72	8.00	72.72
Conducting Participatory Micro-Planning	13.00	48.14	9.00	47.36	16.00	48.48	4.00	36.36
Management Support	17.00	62.96	11.00	57.89	23.00	69.69	6.00	54.54
Manpower Support	17.00	62.96	11.00	57.89	18.00	54.54	5.00	45.45
Supervision	14.00	51.85	9.00	47.36	17.00	51.51	5.00	45.45
Monitoring	18.00	66.66	12.00	63.15	15.00	45.45	4.00	36.36
Support of Social Group /IWDP Authorities / NGOs	22.00	81.48	18.00	94.73	28.00	84.84	8.00	72.72

In the forested sub-watershed of Ramnagar, 81.48 per cent, 70.37 per cent of the VDC members respectively reported that they take the support of social groups/IWDP functionaries/NGOs and provide technical support in the management of CPRs. About 62.96 per cent of the VDC members provide management and manpower support for CPRs management. Similarly, in the agricultural sub-watershed of Ramnagar, 94.73 per cent of the VDC members sought the help of social groups/IWDP functionaries/NGOs in management of CPRs. About 75 per cent of the VDC members have participated in developing norms for CPRs management in forested sub-watershed of Akhnoor, whereas in agricultural sub-watershed, only 54.54 per cent of the VDC members participated in such activities. One thing is quite clear that social groups/IWDP functionaries/NGOs have played a greater role in helping the VDCs in managing the CPRs across the selected sub-watersheds in both Ramnagar and Akhnoor.

Steps Taken by VDCs for Watershed Management

The user groups have meager financial and physical resources at their disposal to perform their task efficiently. User groups have been involved to maintain and share usufruct (grass and leaf fodder) from the protected closures of forest and VCLs. The project with the help of user groups has repaired traditional drinking water sources (bowalies), irrigation water distribution channels (khuls), ponds, water-harvesting structures etc. The bowalies and ponds are mainly used for drinking and cattle population, whereas khuls are used for irrigation. The project has facilitated the transhumance nomadic and semi-nomadic pastoral communities by providing them drinking water, fodder and pasture development

works, and health cover for livestock in areas where they settle during grazing periods in winter and summer. Recently, floating transhumance user groups have been formed and linked with local VDCs in selected sub-watersheds for resolution of conflicts and development of fodder banks.

User groups were active participants in the whole exercise and did play a useful role in providing implementation support in resource conservation and alternative livelihoods. The erring members were taken to tasks through social pressure and there were provisioning of assurance of rights to the resource users to elicit their responsible behaviour, for which traditional knowledge and institutions have been widely used. In some cases, local NGOs' support has also been elicited to supplement watershed development efforts at village level. None of the user groups has shared the investment needs of any kind except voluntary free labour and all the activities were carried out by the project and/or provided in VDP. The self-initiated watershed development efforts were virtually non-existing (See table 2.11).

A majority of the VDC members (above 85 per cent) in forested sub-watershed of Ramnagar have participated in watershed management by providing implementation support and making social pressure on erring members. Whereas in the agricultural sub-watershed, more than 60 per cent of the VDC members have participated in watershed management by providing implementation support, implementing micro-enterprises through creation of SHGs, improving conservation of resources and using traditional knowledge and institutions. Similarly, more than 60 per cent of the VDC members in forested sub-watershed of Akhnoor participated in watershed management by providing implementation support, conservation activities, using traditional knowledge and support, and seeking NGOs support in their efforts.

Table 2.11: Steps Taken by VDCs for Watershed Management

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Steps Taken by VDCs for Watershed Management	No.	%	No.	%	No.	%	No.	%
Providing Implementation Support	24.00	88.88	12.00	63.15	23.00	69.69	7.00	63.63

Implementing Alternative Livelihoods and Resource Uses	14.00	51.85	13.00	68.42	15.00	45.45	5.00	45.45
Action to Improve Conservation	21.00	77.77	15.00	78.94	24.00	72.72	5.00	45.45
Social Pressure on the Erring Members	23.00	85.18	11.00	57.89	18.00	54.54	6.00	54.54
Assurance of Rights to Elicit Responsible Behavior	13.00	48.14	8.00	42.10	18.00	54.54	5.00	45.45
Use of Traditional Knowledge and Institution	20.00	74.07	13.00	68.42	26.00	78.78	4.00	36.36
NGOs Supported Watershed Development Effort	11.00	40.74	9.00	47.36	21.00	63.63	4.00	36.36

Common Property Resources and System of User Rights

Two crucial conditions for meaningful participation in natural resource management are: sufficient incentive for the people to give their time and labour for protection in lieu of the intermediate and final products; and property rights over resources should be clearly defined in writing, well publicized and fully understood by all. Unfortunately, the usufruct sharing arrangements have been reportedly vague and not sufficiently attractive, or even relevant, for the nature of dependence on resources particularly of poor women, disadvantaged and landless. The primary focus has been on income sharing from usufructs. In all the sampled VDCs, the right of direct use of CPRs were recognized and given to the members. In some of the VDCs, right of indirect economic gain was also available. Similarly, the right of exclusion of non-members from sharing of usufruct has also been given (See table 2.12). All the members of sampled VDCs reported that the direct use of the CPR products was given to all the stakeholders across the sampled watersheds. In the forested sub-watershed of Ramnagar, 66.66 per cent of the VDC members reported that right of indirect use of CPR product has been given to the stakeholders so that they can sell the usufructs in the market. None of the VDC has the control over the right of transfer of usufruct; however, the right of exclusion has been reported by 70 per cent of VDC members in forested sub-watersheds and by 42 and 45 per cent respectively in agricultural sub-watersheds of Ramnagar and Akhnoor.

Table 2.12: Common Property Resources and System of User Rights

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
CPRs and User Rights	No.	%	No.	%	No.	%	No.	%
Right of Direct Use	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Right of Indirect Economic Gain	18.00	66.66	13.00	68.42	24.00	72.72	9.00	81.81
Residual Right	22.00	81.48	13.00	68.42	17.00	51.51	6.00	54.54

Right of Exclusion	19.00	70.37	8.00	42.10	24.00	72.72	5.00	45.45

Forest Regeneration and Protection Activities of VDC

The members of user groups participate in decision-making at village level and seem to have a considerable degree of autonomy. The user groups have framed the rules governing VCLs in general body meeting in the presence of local villagers and the project officials. User groups have the legal authority to manage the VCLs. User groups have been nested in a set of larger organizations like village panchayats and VDCs. The access to VCLs and forests for animal grazing has been strictly limited to local villagers. There has been provision of substantial fines for any attempt by villagers to appropriate a larger share of grazing rights by sending more animals in summer than in winter. However, these rules have not been adhered to in actual practice. Overgrazing has not been prevented. A user group has annual meetings to discuss general rules and policies and elect officials, impose fines for misuse of the VCLs, and organize the annual maintenance work. Many of the rules they use keep their monitoring and other transactions costs relatively low and reduce the potential for conflict.

User groups have been engaged actively in forest protection and regeneration activities, which have inculcated a sense of ownership among the users and created awareness on collective issues. All the members of the VDCs selected across the sampled sub-watersheds were reportedly engaged in protection of forestland. About 77 per cent of the VDC members in forested sub-watershed of Ramnagar reported that project has inculcated a sense of ownership of natural resources among them. In forested as well as agricultural sub-watersheds of Akhnoor, about 80 per cent reported that the project has created a sense of ownership among them. More than 70 per cent of the VDC members in sub-watershed of Ramnagar reported that project has created a sense of collective responsibilities among them to regenerate and protect the forest resources. However, they have been unable to evolve the system of rotational watch and ward for monitoring of resource conservation and protection activities. The project has opted for a system of local paid watch and ward that are employed with IWDP on contractual basis. The watch and ward were authorized to levy

fines on those who fail to adhere to the rules; however, not a single instance of fine has been reported even for repeated failure to observe the rules (See table 2.13). User groups along with VDCs have created detailed authority rules specifying in various ways how much of each valued product a user could harvest from the forest and under what conditions. The rules used in selected sub-watersheds were tailored to the specific environment, to the particular economic roles that various forest products played in the local economy, and to the need to minimize the costs of monitoring labour inputs, resource unit and outputs, and compliance with the rules. User groups have also devised their own monitoring and sanctioning system. The forests usually were closed, except for specified periods; anyone caught in the enclosed forests at other times obviously was not following the rules. The forest resources have been subjected to unrestrained use and competition among users for the better spots, which had increased production cost, as well as the level of uncertainty regarding the fuel-wood and fodder potential.

Table 2.13: Forest Regeneration and Protection Activities of VDC

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Forest Regeneration and Protection Activities of VDC	No.	%	No.	%	No.	%	No.	%
Protection of Forest Land	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Inculcates a Sense of Ownership	21.00	77.77	13.00	68.42	28.00	84.84	9.00	81.81
Collective Responsibilities	19.00	70.37	14.00	73.68	18.00	54.54	5.00	45.45
System of Payment to Watchman	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Norms Regulation Forest use for Consumption Needs								
Fuel Wood Holiday	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Fixed Day of Fuelwood Collection	16.00	59.25	12.00	63.15	23.00	69.69	7.00	63.63
Collection of only Dried Twigs and Branches	16.00	59.25	12.00	63.15	23.00	69.69	7.00	63.63
Keeping Fixed Time for the Collection of Fodder	24.00	88.88	11.00	57.89	13.00	39.39	6.00	54.54
Cattle Grazing after Forest Regeneration	23.00	85.18	14.00	73.68	16.00	48.48	3.00	27.27
Free Asses to Non Timber Forest Produce, with Seasonal Restrictions	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Forest Closed to Non Timbers	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Linkage with Line Department								
Maintenance of Nurseries	18.00	66.66	12.00	63.15	23.00	69.69	5.00	45.45
Tree Plantation	20.00	74.07	18.00	94.73	24.00	72.72	5.00	45.45
Control over Implementation	17.00	62.96	13.00	68.42	24.00	72.72	5.00	45.45

All the villagers were included in the list of beneficiaries. The members were permitted to collect dried fuel, fodder and other forest resources from the protected forests on weekly basis. During winter, entry into the forests was totally banned to prevent the misuse of the forest resources and to regenerate and improve the resource potential. It is significant to note that no attempt has been made to specify the rules such as number of collector per household, distribution

of cut produce and equal sharing of usufruct among the members. The individual benefit maximizing tendencies dominate in the absence of such rules. The system of rotational watch and ward seems to be unsustainable and may not persist after the withdrawal of the IWDP. The provision of fines and penalties were made to enforce the rules strictly. The defaulters were to loose their membership on user groups in case of repeated misuse of rights. The house repairs and construction requirements of the villagers are met by the use of timber, for which the villagers have to seek the prior permission of the executives of the user groups and VDCs. In such cases, the villagers have to pay a nominal fee for the timber use and strictly adhered to the rules in operation, failing which penalties and even suspension of the membership of user groups are in force. The mature trees fit for harvesting are marked by the executives and allowed to harvest by the eligible members with proper sanction of the executives of the user groups. No harvesting of trees is authorized except the repairs and construction needs.

No doubt, numerous rules have been framed for regulation of resource use, however, in actual practice the rules compliance has not been cent percent and cases of rule infringement have also been reported. At the same time, the monitoring of rule compliance was also very difficult under the existing rules due to system of paid watch and ward. Although the existing resource system is not a private property system, rights to use forest resources and duties to respect these rights are well defined. User groups and VDCs have used the services of project functionaries to legitimize their role in helping to devise a workable set of rules. User groups and VDCs have also forged suitable linkages with line departments specifically for activities like maintenance of nurseries, tree plantation etc. For instance, more than 60 per cent of the VDC members in agricultural as well as forested sub-watersheds of Ramnagar reported that they have forged suitable linkages with line department for maintenance of nurseries and tree plantation. In agricultural sub-watershed of Akhnoor, only 45 per cent of the VDC members had done so. On the whole, the existing user groups provide an example of a self-governed common property arrangement in which the rules

have been devised and modified by the participants themselves, but with external support. However, due to vested interests and inadequate capacity building of the members, the rules have not been adhered strictly and monitoring of the rules compliance has been reportedly very weak.

Cost Sharing Arrangements

Local communities are often reluctant contributors to a development activity. For decades, they have benefited from such schemes for free. Even now, many schemes are implemented without any contribution required from them. This may jeopardize local people's rights to demand quality in project implementation, of their due share in the benefits. They have many previous experiences of promised benefits not materializing, whereas contributions are expected up front. The challenge for the development agency is to convince beneficiaries that the cost of their contribution will be far outweighed by the benefits, and that the agency will fulfill its part of the obligation by making resources available to implement the scheme. The extent of beneficiaries' willingness to contribute towards the costs of soil- and water-conservation activities works as a 'litmus test' of their interest and commitment. Public funds should be used where benefits cannot be captured, or where there are considerable externalities of costs or benefits, which cannot be internalized.

When the beneficiaries make a contribution, they acquire the right to demand quality. When a development agency uses participatory approaches, it shows respect for people's knowledge and incorporates their suggestions in the work. People's confidence in the agency is enhanced enormously, strengthening their willingness to contribute towards the cost. The project staff discussed the soil- and water conservation rehabilitation works to be implemented in the village with the user groups and members of VDCs. They were free to suggest modifications to ensure enhance benefits. Each aspect of the proposed works have been discussed jointly and placed before the higher decision making authorities and were largely approved. In such situations, it was easy to collect the beneficiaries' contributions. All the project interventions have been implemented in participatory

manner and are working satisfactorily. PRAs also highlights that in most of the project interventions benefits exceeds the costs. The participatory planning by the project might prepare the ground, and in some cases may be convincing enough for the people to take responsibility for participatory development. However, if there were doubts and misgivings, exposure visits to successful development schemes were also organized.

During PRAs with project functionaries, it has been revealed that initially the beneficiaries showed much reluctance to the idea of cost sharing. The beneficiaries argued that development and welfare have been the responsibility of the state and they were too poor to contribute their share towards project activities. The correlation between cost sharing and benefits was not obvious to them, as their experience with the project was too short. Moreover, they want to know how the savings on account of their contribution would be spent. The willingness to share costs was also influenced by how effective and representative are the VDCs. The transparency of accounts was another factor that matters to the beneficiaries. With the concerted efforts and motivational campaigns by the social development functionaries, the beneficiaries were willing to contribute their share in project activities. Ultimately, the cost sharing by the beneficiaries was dependent on the three main pre-requisites in the following order:

Money collected from the beneficiaries is to be ploughed back in the same village for watershed development activities;

Mode of spending is to be decided by the genuinely elected/selected VDCs; and

Transparency is to be assured in maintenance of the accounts.

On the whole, the willingness of the beneficiaries to share costs to a greater extent is determined by effectiveness of the VDCs. Most successful experiments in cost sharing show that success is achieved through NGOs/village institutions in the programme. Recently, election of panchayats has been held, which would also pave the way in motivating the beneficiaries in cost sharing. The local NGOs have also played their part in creating awareness among the stakeholders to share the cost of the project activities. The status cost sharing by beneficiaries in

the project area and non-project area on watershed interventions is shown in table 2.14. In the agricultural sector, 50 per cent and 60 per cent cost of inputs respectively on rainfed crop demonstration is to be borne by the beneficiaries in project area and non-project area. As such, the difference between project area and non-project area is 10 per cent. In case of on-farm fodder production, the difference in cost sharing is much wider, as the inputs for on-farm fodder production is provided free of cost by the government department in non-project area. In project area, 50 per cent of the input costs are to be borne by the beneficiaries. It is significant to note that full labour cost in rainfed crop demonstration and on-farm fodder demonstration is to be met by the beneficiaries in project as well as non-project area.

Table 2.14: Status of Cost-Sharing by Beneficiary (per cent)

Sub-Component	Cost-Sharing by Beneficiary			Difference
Agriculture	Project	Project	Non-project	Project Area -
Rainfed Crop Demonstration	Document	Area	Area	Non-project Area
Cost of Inputs	50	50	60	-10
Labour Contribution	100	100	100	0
On-Farm Fodder Production				
Cost of Inputs	25	50	Free	50
Labour Contribution	100	100	100	0
Horticulture *				
Plantation	60	60	25	35
Nurseries	NA	60	Free	60
Village Common Land *				
Silvipasture Development	10	25	Free	25
Silvipasture Maintenance	100	70	Free	70
Afforestation	NA	10	Free	10
Drainager Line	Locational **	7	Free	7
Water Resource *				
Water Harvesting Structure	25***	20**	Free	20
Natural Water Points	25***	25**	Free	25
Irrigation Channels	25***	25**	Free	25
Livestock Component				
Artificial Insemination	8	10	Free	10
Natural Breeding	33	28	Free	28
Veterinary Services	NA	10	Free	10
Source: *Status Report for Supervision Mission of World Bank*, IWDP (Hills-II), J&K, 2001				
Benefit and Cost-Sharing Arrangements with Beneficiaries, IWDP (Hils-II), J&K, 2000				
Notes: * Ratios for Labour Contribution, ** Full Maintenance by Beneficiary, and				
*** 50% Maintenance by Beneficiary				

In the horticulture sector, the beneficiaries are supposed to contribute 60 per cent of the cost of plantations in project area, whereas, in non-project area, the government department gives a subsidy of 75 per cent. In case of nursery development, government department gives 100 per cent subsidy nursery development, whereas under the project, the beneficiaries have to contribute to

the tune of 60 per cent of the cost. It is significant to note that in project interventions such as silvipasture development and maintenance, and afforestation on VCLs, a higher proportion of the project cost is to be borne by the beneficiaries, whereas in non-project area, such interventions are 100 per cent subsidized. In case of water resource development, 20 per cent and 25 per cent of the costs respectively of repairs and construction of water harvesting structures and natural water points and irrigation channels are to be borne by the beneficiaries. Besides, the whole of the maintenance costs is to be borne by the beneficiaries themselves. It is to be noted that due to poverty, the beneficiaries were unable to contribute their share in money, as such they have been encouraged to contribute their share in terms of labour on project interventions such as development of horticulture, VCLs and water resources. On project intervention such as livestock development, the beneficiaries were expected to contribute to the tune of 10 per cent for artificial insemination, 28 per cent for natural breeding, and 10 per cent for veterinary services, whereas in the non-project area livestock development services are provided free of cost.

Table 2.15: Proportion of Cost Sharing by Beneficiaries on Various Sub-Component

Sub-Component	Cost Sharing by Beneficiaries (%)			Difference
	Years			1999-2000 -
Agriculture	1999-2000	2000-01	2001-02	2001-02
Rainfed Crop Demonstration	14.19	36.26	34.24	20.05
On-Farm Fodder Demonstration	10.7	36.96	0.14	-10.56
Vegetable Kits	NA	34.14	0.25	0.25
Vegetable Field Boundaries	12.3	3.54	56.77	44.47
Horticulture				
Rainfed Horticulture Demonstration	53.45	78.34	76.46	23.01
Village Common Land				
Afforestation	4.67	4.92	10.34	5.67
Protected Forest Land/Govt. Land				
Afforestation	0	0.44	8.52	8.52
Forest Regeneration	1.56	0.62	10	8.44
Pasture Development	6.85	10.42	14.93	
Water Resource				
Water Harvesting/ *Bowlies*/Ponds/etc.	4.86	551.8	8.34	3.48
Livestock Development				
Artificial Insemination	0.008	0.07	5.189	5.181
Veterinary Services	0.0007	0.03	6.16	6.1593

Source: *Status Report for Supervision Mission of World Bank*, IWDP (Hills-II), J&K, 2001

Over the period, the idea of cost sharing has gained momentum and beneficiaries' contribution has shown an increasing trend as revealed in table 2.15. In 1999-2000, 14.19 per cent of the project cost on rainfed crop

demonstration was shared by the beneficiaries, which increased to 36.26 per cent in 2000-2001 and declined marginally thereafter to 34.24 per cent in 2001-2002. On-farm production, the beneficiaries' share was as high as 36.96 in 2000-2002, and declined to a low of 0.14 per cent. This can be attributed to the fact that by 2001-2002, the project has curtailed its intervention drastically in this area, as most of the farmers have been exposed to improved methods of on-farm fodder production, and now the beneficiaries are engaged in improved on-farm fodder production activities at their own. In 2000-2001, the scheme of provisioning of vegetable kits has been implemented in a big way, for which beneficiaries contributed to the tune of 34.14 per cent of the project cost. It is significant to note that beneficiaries are sharing as high as 56.77 per cent of the cost of constructing vegetative field boundaries and 76.77 per cent towards rainfed horticultural demonstration. Keeping in to view the subsidized culture in state departments, the high proportion of the beneficiaries' share towards project activities clearly reflects the robustness of the participatory institutions such as VDCs/user groups created by the project. Besides, the role of the social development functionaries of the project and local NGOs in creating the awareness and motivation amongst the beneficiaries is also not over-emphasized.

The table 2.16 gives data on total expenditure and beneficiaries' contribution in the project during the period 1999-2000 to 2001-2002. A perusal of the table makes it evident that the total expenditure of the project in 1999-2000 was Rs. 2483.39 lacs, out of which the beneficiaries' contribution was Rs. 66.82 lacs. In 2000-2001, the total project expenditure increased significantly to Rs. 4313.27 lacs and beneficiaries' contribution also increased to Rs. 361.54 lacs. In the year 2002-2002, the total expenditure of the project declined to Rs. 1745.76 lacs and the beneficiaries' contribution also declined to Rs. 216.22 lacs. However, in percentage terms, the beneficiaries' contribution has increased over the period from 3 per cent in 1999-2000 to 9 percent in 2000-2001 and further to 12 per cent in 2001-2002. On average, the beneficiaries' contribution to the project was 8 per cent. Thus, it is not wrong to infer that as a result of initiation and

strengthening of participatory watershed development, the beneficiaries' contribution to project has increased.

Table 2.16: Project Expenditure and Beneficiary Contribution/Transaction Costs (Rs./lacs)

Year	Outlay	Project Expenditure	Beneficiary Contribution	Total Expenditure	Beneficiary Per cent
1999-2000	2500	2416.57	66.82	2483.39	3
2000-01	4000	3851.73	361.54	4213.27	9
2001-2002	6000	1529.54	216.22	1745.76	12
Total/Average	12500	7797.84	644.58	8442.42	8

Source: Status Report for Supervision Mission of World Bank, IWDP (Hills-II), Jammu and Kashmir, 2001

It is significant to note that beneficiaries have contributed only marginally towards the protection and maintenance of CPRs such as water harvesting structures, VCLs, forestland, state lands, etc., which have common benefits in nature than individualized benefits. One thing which is quite disturbing is that why beneficiaries have shown reluctance in cost sharing in livestock development services such as artificial insemination which has individualized benefits. For example, they have shared to the tune of around 5-6 per cent of the project cost for these services. It is to be noted that there are wide variations in the proposed cost sharing arrangements in the project documents and actual realization. On personal interaction, it was revealed that the government dispensaries are offering livestock services free of cost and they do not find any justification for project dispensaries to charge user fee. As such, the social development functionaries of the project have to take beneficiaries into confidence and clarify them of the advantages of improved veterinary services such as artificial insemination offered by the project dispensaries. Similarly, the government department in non-project area manages the VCLs, forestland and state land, whereas the project emphasized on beneficiaries' contribution in CPRs management. All such discrepancies between the policies of various development agencies of the state and the project need to be removed by learning from each other's experience, otherwise, it would be difficult to build a consensus regarding beneficiaries' contribution towards project activities.

Benefit Sharing Arrangements

Under IWDP (Hills-II), greater emphasis has been placed on devolution and participatory management of CPRs and strengthening of partnership with NGOs to manage watershed resources in sustainable fashion. Participation allows the poor a voice and transfer of responsibility gives them the power to discover and determine ways to improves their lives. The livelihood of the rural poor depends on the success with which CPRs are managed, and on the environmental consequences of their management. The participation of the local stakeholders has proved essential for effective and sustainable management and conservation of natural resource system and in general, is fostered by significant degree of decentralization to local communities. Because participatory resource management benefits cannot be withhold from anyone, and also because of their size, most irrigation system, forest and rangelands cannot be managed individually or by the household, and required coordinated regulation. Programmes to dissolve natural resource management are generally based on the assumption that user will take on the role formally assigned to the state. This require some form of collective action to coordinate individual's activities to develop rules for resources use, to monitor compliance with the rules and sanction against violators, and to mobilize the necessary cash, labour or material resources. Moreover, natural resources have multiple uses and users. Many of these uses have high economic value or essential to the livelihood of different households. Several government projects have demonstrated that external approaches with focus on resource management to maximize the single use are not likely to be as appropriate in these situations as rules that are developed locally through negotiation between different users. Local collective action can be instrumental in finding rules and allocation of resource between different users in a way that is seen as equitable by the users themselves. There is, therefore, equity as well as productivity arguments for collective action in natural resource management.

In the context of IWDP (Hills- II), participatory approaches were implemented to provide the poor and women with an equitable share of benefit, which required

more efforts and vigilance. Nevertheless, what is certain is that if only weak efforts are made to do so, then the lion's share of the resource will be taken over by the rich. The opportunity to capture the benefits of collective action provides the motivation to cooperate. Individuals must receive sufficient benefits to offset their collective action costs. Numerous factors affects the ability of individuals and groups to capture the benefits they jointly produce, ranging from the physical features of the resource to the institutional settings in which the group acts. For example, resource users are unlikely to act collectively to maintain or enhance the flow of a resource if they do not control the stock. Likewise, if resource users cannot define and enforce property rights over the benefits that they would produce, they are unlikely to undertake collective action. Even if resource users could capture sufficient benefits to balance their cooperation costs, distribution problems may impede collective action. The potential participants may be unable to agree on a fair allocation of benefits and costs. If resource users are relatively homogeneous, distributional issues are believed to be much less severe, whereas if resource users are heterogeneous, distributional issues may make collective action difficult or impossible.

Deciding to undertake collective action implies that two questions regarding the capture of benefits and the allocation of costs-have to be answered positively. First, can the resource users, as a group, receive sufficient benefit to act collectively? Secondly, can individual resource users capture sufficient benefits to compensate for their contribution to the collective action? Both collective production and benefits strongly influence the answers to these questions, and therefore individuals' choices to act, or refuse to act, collectively. Both factors must be accounted for, if the successes and failures of collective action are to be understood. IWDP (Hills-II) has created user groups with relatively few members (15-20 persons), who helped them to capture sufficient benefits from collective action, and facilitated smoother distribution of the benefits among the members. The small number of users effectively cooperates to produce substantial benefits for themselves, to the exclusion, and perhaps even the detriment of all other. The cost-sharing mechanism promoted by the project has resulted in development of

successful collective arrangements to resolve common pool resource dilemmas. The cost sharing mechanism has facilitated in creating greater space for the users in collective action by evolving a sense of ownership, thus facilitated the users' participation in natural resource management. For example, as the quality of the resource units (water, fuelwood, fodder, etc.) harvested from the regenerated/rehabilitated resource improves, the users will over the period reap the benefits, which may outweigh the additional costs of the switch to new institutional arrangements. In such situation, the users will not tolerate the degradation of resource and try to capture a net benefit from collective action. They will attempt to use a resource in an economically viable way.

The following questions were kept in mind while deciding about benefits sharing mechanism under IWDP (Hills-II):

Which individual (and how many) withdraw resource unit (e.g. water, fuelwood, fodder) from a given resource system?

What positions or roles do individual fill (e.g. member of user group, water user association)?

Do participants act on their own initiative, or do they confer with other?

Does an appropriator obtain a permit before harvesting?

What resource boundaries are affected by the actions of the participants?

What harvesting technologies are used?

Are there open or closed seasons?

What are the direct costs and benefits result from various outcomes?

The project interventions have resulted in numerous individualized benefits from activities such as rainfed crop demonstration, on-farm fodder production, vegetable growing, vegetative stone bunding, rainfed horticultural demonstration on private lands, artificial insemination, etc. The project has provided the individual farmers with subsidized agricultural inputs (both seed and non-seed inputs), which resulted in substantial improvement in crop productivity. The soil and water conservation activities carried out with project assistance have improved the soil-moisture, vegetation, and water quality and reduced the soil

loss. The rainfed horticultural demonstration has resulted in moderate improvement in horticultural activities and contributed toward their livelihood improvements by increasing the income and nutritional status of the farming household. The agro-forestry has contributed and helped the farmers through increased availability of fuelwood. The system of artificial insemination has benefited the farmers in switching over the hybrid cattle with improved yields, which has reduced the pressure on CPRs substantially. The availability of water resources has also improved over the period, which has reduced the workload of women, especially female children, who were to travel a long distance to fetch water.

The project staff along with user groups and VDCs jointly framed the working rules for resource allocation and benefit sharing. The following types of working rules were designed to regulate the resource use: entry and exit rules, position rules, scope rules, authority rules, information rules, aggregation rules, and payoff rules. Entry and exit rules affect the number of participants, their attributes and resources as well as the conditions they face on entering or leaving the user group. Position rules establish positions or roles in the situation. Scope rules delimit the outcomes that can be affected and linked to specific outcomes. Authority rules assign sets of actions that participants in a particular position must, may, or may not take. Information rules affect the information of the participants and aggregation rules affect the level of control that participants in a position exercise in a particular situation. Payoff rules determine the benefits and costs assigned to particular combination of action and outcomes, thereby establishing incentives and deterrents.

Keeping these rules in use in mind, benefit-sharing mechanism from a common pool resource after its rehabilitation and regeneration took place in following ways:

The project has created numerous user groups such as water users associations, fodder user groups, transhumance groups etc. The number of appropriators in all the user groups were restricted to less than 20, and were entitled to manage and appropriate from a well-defined resource unit. The project

has paid more attention towards creation of homogeneous user groups. The initial group formation took place without any contribution from the members and membership was voluntary, but restricted to poor households. However, all the poor villagers do not took the membership of user groups. Later, after successful implementation of project interventions, when the benefits were accruing to the participants, other members were also attracted towards becoming members of user groups. However, new entrants to user groups were required to pay an entry fee, which varies across the types of the user groups and selected sub-watersheds. The user groups were given property rights over the resource use and transfer of property rights in case of higher benefits. The rules once framed were not changed subsequently, as negligible cases of violation of rules in use were reported in the project area.

In case of closures on forestland and village common lands, access to these resources were restricted for initial period of one year, so that natural regeneration may take place and newly planted saplings may grow up to withstand harsh environment conditions. After an interval of one year, these were open to rotational and regulated use by the members of user groups, who were well defined, small-homogenous groups living nearby the resource. The outsider entry into these resources were strictly banned and enforced through local paid watch and ward arrangements made by the project. The members of user groups also participate in monitoring of the enclosed resource and the benefits accrued from the rehabilitated CPRs. The users groups have also forbidden the use of mechanized tools for harvesting the resource such as fuelwood and fodder from regenerated forestland and village common lands. In case, a poor member need timber products to repair his/her house, prior approval from the executives of user group and village development committee was made mandatory. In case a member was found violating the rules identified above, strict actions were proposed ranging from fines to loss of membership of user groups.

During the PRAs with different user groups, the benefit sharing arrangements from watershed development and protection under new institutional arrangements have been assessed. For instance, in case of transhumance user

groups, the pastoral households have been encouraged to form groups to manage the pastures in sustainable manner. A member pastoral household was permitted to graze 30 sheep/goats and 10 buffaloes on a common pasture. In case, a pastoral household has more number of animals than prescribed under rule, a system of user fee per extra animal was put in place, which varies across the project area and decided by the user groups themselves. The funds so raised were deposited in a common fund used by the group to meet contingencies such as expenses on animal health services. A given pasture was open to graze for a maximum period of 3 months; however, number of grazing days can be increased or decreased, keeping into view the quality of the pastures. The rotational uses between pastures were allowed to ensure regeneration of a given pasture. The transhumance groups have strictly enforced the rules in use and in case of violation of the rules in use; strict actions were proposed, depending on severity of infringement. As the members are closely and socially knitted, social factors compel them to adhere to the rules in use. Some of the unscrupulous members, however, does not conform to social norm and attempted repeated violations of the rules and invited actions for infringement of rules in use. However, no severe actions have been initiated in any case.

In case of forest user groups, there has been complete ban on entry into the protected forests for initial one year, so that regeneration of resources should take place. It has resulted in significant decline in the livelihood options for the poorest of the poor who depend on CPRs more than the non-poor. After an interval of one year, the regenerated forests are open for regulated use. The forest user groups are small and homogenous groups consisting of 15-20 members. Only the members were permitted to reap the benefits from the regenerated and protected forests. An individual member was permitted to carry one head load of dry fuelwood per household per week from CPRs for a family of five persons and in case the family size is more than five persons, two head load of fuelwood per household per week was permitted. The members have to ensure that the weight of a head load of dry fuelwood do not exceed the agreed norms of 10 kg. The project has the provision of rotational paid watch and ward.

The involvement of users in rotational monitoring has not been paid adequate attention, which may pose serious problem of break down of the participatory institutions when the project withdraws from the area. It seems that project has not learnt lessons from earlier experience of phase-I, where the user groups did not maintain assets created by the project, once the project is withdrawn.

The fodder user groups have also been created for rational use of fodder during rainy season (mostly July to September) each year. An individual member of the fodder user groups was permitted to carry one head load of 20 kg. of green fodder per household per day. Those of the member's household, who have surpluses, resort to storing the fodder to be used in winter when there is fodder scarcity. Some of members sell the green/dry fodder to other villagers at a pre-determined price by the user groups, however, the price vary as per the deficit/surplus situation. Mostly, the surplus member household prefers to sell the dry fodder in winter, when fodder is scarce and fetch higher price. There is no problem of storing the fodder, as these are stored in open space in the backyard of the household premises. Even after meeting the genuine demand of the members of user groups as per the rules in use, if some surplus fodder remains in the CPRs, it is harvested by the groups by pooling their labour and selling the same within the village to fodder scarce households. The funds so raised are deposited in watershed revolving fund to be utilized to meet emergent needs to the members on interest free credit. In some of the villages in forested watersheds, the user groups have created and maintained fodder bank from which the member can get the fodder at commonly agreed pre-determined price. Attempts have been made to enforce the rules in use and in case of violations, strict actions have been proposed. Over the period, a very few cases of violations have been reported and in none of the case stringent actions were initiated.

The benefit sharing in participatory watershed development is largely determined by the local conditions and needs of the people, the objectives of the project and the perceived importance and priority of the benefit. The main types of benefits envisaged by the VDC members and user groups to participate in the project activities are the benefits such as increased wage employment on construction

and maintenance works, creation of closures on VCLs and forestland, etc. However, these may prove counter productive in sustaining the interests of VDC/user group members in the event of monetary returns declining. Such organization would not be long enduring, if only monetary returns are the basis of sustainability. This may increase the dependency of the people on the project assistance, and fails to increase their organizational capacity. Besides monetary gains and increased resource availability, there were also indirect gains to the members of user groups and VDCs. These indirect benefits include courage gained by the members to speak at forum, space for the disadvantaged groups to participate in decision making, increased unity and the positive image of the members in the eyes of others (See table 2.17). In the forested sub-watershed of Ramnagar, more than 70 per cent of the VDC members reported that increased availability of fuelwood for domestic use, courage gain by the members to speak at forum, allowing landless an extra share of fodder from the forests and enrolling and making space for the weaker groups to participate in collective actions as the main types of benefits from participatory watershed development. More or less similar is the situation across other VDCs, with minor variations across forested and agricultural sub-watersheds. Some of the above benefits are categorized as individualized social/economic/material/ benefits, while others are called collective benefits. While individual economic and individual material benefits are the starting points for participatory watershed development, they also serve to sustain members' interest over time.

Table 2.17: Types of Benefits envisaged by VDCs

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	No.	%
Types of Benefit								
Wage Employment	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Increase Availability of Fuelwood for Domestic Use	24.00	88.88	14.00	73.68	27.00	81.81	9.00	81.81
Courage Gained by Member to Speak at Forum	23.00	85.18	13.00	68.42	23.00	69.69	8.00	72.72
Allowing Landless an Extra Share of Fodder from the Forests	25.00	92.59	15.00	78.94	22.00	66.60	6.00	54.54
Enrolling and Making Space for the Weaker Groups to Participate	19.00	70.37	14.00	73.68	19.00	57.57	6.00	54.54
Building a Fund for the Collective Action	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Forest Regeneration due to Regulated Use	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Increased Unity	14.00	51.85	11.00	57.89	20.00	60.60	7.00	63.63
Positive Image in the Eyes of Others	17.00	62.96	14.00	73.68	21.00	63.63	8.00	72.72

While introducing participatory watershed management, one of the first things to be mentioned is the provision for benefit sharing from plantations in enclosures on village common lands (VCLs) and forestlands to user groups. Not surprisingly most villagers, particularly the ones likely to be least affected by VCLs and forestlands being closed for regeneration were attracted by the prospect of receiving money in lieu of labour services. However, many project functionaries complained that the villagers are primarily interested in money but that is what they themselves use as bait to get the villagers interested. As VCLs and forestland closures take several years to regenerate, project staff found it difficult to sustain the villagers' interest during the long waiting period. To increase its credibility among the villagers, project has started sharing usufructs from exiting older plantations with the user groups.

The members of the user groups have user rights over the CPR resources. The villagers have a customary right to collect fuel-wood and timber from the better-stocked VCLs and forests in their vicinity. They are unlikely to buy what they can get free. In any case, the poorest forest users do not have the cash to buy such subsistence goods. The issue here is not that the villagers, particularly those dependent on forest for subsistence and livelihood needs, are only interested in money but that is the only option made available. Satisfaction of livelihood or subsistence needs, especially of the poorest groups is not taken into account and the operative paradigm is usufruct sharing from non-protected VCLs and forests. The entry to the enclosed VCLs and protected forests has been restricted for the initial period of one year. After the interval of one year, the enclosures and protected areas were opened to the members for collection of dried fuel and fodder. The entry of non-members and outsiders is strictly restricted to the enclosed and protected CPRs so that others who have not contributed to those efforts will not reap any benefits produced by users' efforts. The system of paid watch and ward by the project is in place to exclude outsiders and non-members from access and appropriation rights as well as to oversee the misuse and overuse of the resources after regeneration.

Ignoring about the benefit sharing is the most important single factor, which has hampered the extension of participatory watershed development programme. It easy for the project to allow the use and fuel wood shrubs from privately owned land to the owner of the land. It is quite a different matter to allow them any significant benefits in protected CPRs. Even if the functionaries of the project are convinced of the need for benefit sharing with the local people, they may first have to amend their laws and rules and convince their forest department before they would be allowed to take necessary steps towards benefits sharing. In doing so, it would be essential to study the various system of benefit sharing in other projects under similar condition and their success and failure. There is a clear need to analyze and revise the existing benefit sharing provisions to make these relevant to resource users' needs and ensure that they provide stronger incentives to villagers to participate in watershed development and protection. Members of the user groups and VDCs need to have the first right to all forest produce from the area for satisfying their subsistence and livelihood needs. A principle should be established that no produce should to be sold out of the village (or hamlet) unless it is surplus to local needs. In this way, a sense of ownership of the resources will be encouraged and villagers may then find it worthwhile to incur the costs of protection and management.

Conflicts and Conflict Resolution

Ostrom (1990) emphasized "appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials. In participatory natural resource management, the appropriators themselves are the monitors and sanctioners. Although the presence of conflict-resolution mechanism does not guarantee that appropriators will be able to maintain enduring institutions, it is difficult to imagine how any complex systems of rules could be maintained over time without such mechanisms". A criterion for assessing user groups and VDCs effectiveness should be whether the poorest and highly resource dependent members of the community have been enable to become members, and whether their more

specific livelihood needs have been given special attention. Due to provision of positive discrimination and representation of disadvantaged groups on VDCs and user groups, they have considerable stakes on CPR resources to eke out a livelihood. However, 77 per cent and 63 per cent of VDC members respectively in forested and agricultural sub-watershed of Ramnagar reported that lack of positive discrimination was one of the potential sources of conflict in participatory resource management. The poor and disadvantaged have been provided intermittent casual work by creating closures on VCLs and forestland, and other infrastructure development activities, without the issue of their sustained livelihood needs being addressed seriously. Thus, the present approach is to shift their livelihood needs to elsewhere, without taking into consideration their long-term livelihood needs. The mutual distrust and ill will among the members was reportedly the main area of conflicts in the selected sub-watersheds. About 81 per cent of the VDC members in the forested sub-watershed of Ramnagar and Akhnoor, and agricultural sub-watershed of Akhnoor reported mutual distrust and ill will as a source of conflicts among the members. Besides, superiority-inferiority complex was also a perceived to be an area of potential conflicts in participatory resource management (See table 2.18).

Table 2.18: Perception Regarding Areas of Conflicts in Resource Management

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Areas of Conflicts	No.	%	No.	%	No.	%	No.	%
Lack of Positive Discrimination	21.00	77.77	12.00	63.15	17.00	51.51	5.00	45.45
Inadequate Representation of Disadvantaged Groups on VDC	15.00	55.55	10.00	52.63	23.00	69.69	4.00	36.36
Superiority-Inferiority Complex	18.00	66.66	8.00	42.10	17.00	51.51	6.00	54.54
Mutual Distrust and Ill-Will	22.00	81.48	12.00	63.15	27.00	81.81	9.00	81.81
Illegal Use of Forest Resources	9.00	33.33	13.00	68.42	12.00	36.36	3.00	27.27

On personal interaction with the villagers, it has come to notice that restrictions on resource use and ban on grazing for initial regeneration period in the enclosed VCLs and forestland has been enforced. Either there is a shift in pressure to other areas or the resource poor groups are compelled to spend more time and labour for procuring fodder by other means. The present project interventions, by creating closures on VCLs and forestland, are contributing to increasing scarcity of grazing resource rather than ameliorating exiting shortages. Under the present system, many grazers may be unwilling to form or join a user group, fearing that

the user groups may stop their very source of livelihood. Providing alternative livelihood sources and skills and training and organizing them into self help groups, with capital and marketing support, will be needed to make grazing economically unattractive to them. This, however, is a long-term solution. The effort should be to make it sustainable through creating new fodder resources and making them accessible to poor grazers, rather then trying to eliminate the practice. The inadequate representation of landless and disadvantaged groups on VDCs and user groups has created superiority-inferiority complex and mutual distrust and ill will among the members. The cases of illegal use of forest resources have also been reported due to laxity in conformance to the rules.

Table 2.19: Steps Taken Towards Conflict Resolution by VDCs

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Steps Taken Towards Conflict Resolution	No.	%	No.	%	No.	%	No.	%
Propagation of Significance of Conservation and Protection	24.00	88.88	14.00	73.68	23.00	69.69	7.00	63.63
Use of Local Traditional Knowledge in Conservation and Protection	22.00	81.48	17.00	89.47	25.00	75.75	9.00	81.81
Devolution of Rights and Responsibilities	16.00	59.25	11.00	57.89	24.00	72.72	5.00	45.45
Participatory Exercise for Institutional Building	23.00	85.18	19.00	100.00	28.00	84.84	7.00	63.63
Equal Benefit-Sharing Arrangements	24.00	88.88	13.00	68.42	29.00	87.87	8.00	72.72

VDCs have taken essential steps for resolution of conflicts arising in watershed development and protection, which includes propagation of significance of resource conservation and protection, use of local traditional knowledge in conservation and protection, devolution of rights and responsibilities, participatory exercises for institutional building and equal benefit sharing arrangements (See table 2.19). It is significant to note that the necessary steps for conflict resolution such as transparent, regular and systematic monitoring and capacity building exercise were not attempted in any of the selected sub-watersheds. There is urgent need to remove all the potential sources of conflicts by making the whole process of participatory watershed development really participatory, transparent and equitable. The members of the VDCs should be imparted necessary training in participatory conflict management. The interests of the landless and disadvantaged groups who are heavily dependent on CPRs to eke out a livelihood should been attended to.

Equity Issues

The community institutions are possibly the most important and most complex yet least understood actor in the institutional arrangement. Through the community institutions individual resource users are reached. Its principal function is to provide an institutional mechanism that can articulate and represent the interests of all users of a resource. This can happen only if each interest group is adequately represented in the organization, and if the organization facilitates inter group negotiations and consensus on balancing relative costs and benefits of various resource management options. The participatory resource management also requires linking clearly defined groups of resource users with the management of clearly defined resource boundaries. IWDP (Hills-II), Jammu and Kashmir has selected only those micro-watersheds and villages, which were considerably degraded. Even within those villages, watershed development and protection has been practiced only on patches of degraded forest and not on the resources as a whole. All the people living in the selected micro-watersheds and villages were included as target groups; however, special attention has been paid to include the women, landless and disadvantaged sections as beneficiaries.

Table 2.20: Perception Regarding Equity Concerns in Resource Management

	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Equity Concerns	No.	%	No.	%	No.	%	No.	%
Representation of Disadvantaged Groups Executive Committee	23.00	85.18	12.00	63.15	25.00	75.75	9.00	81.81
Freedom of Participation in Meetings/Decision Making	21.00	77.77	15.00	78.94	27.00	81.81	6.00	54.54
Equal Benefit-Sharing Arrangement	22.00	81.48	14.00	73.68	28.00	84.84	5.00	45.45
Participation of Weaker Groups in Conflict Resolution	23.00	85.18	11.00	57.89	22.00	66.60	9.00	81.81
System of Positive Discrimination	22.00	81.48	14.00	73.68	19.00	57.57	7.00	63.63

The perceptions of the VDC members regarding equity concerns in resource management have been sought, which is presented in table 2.20. A large proportion of the VDC members reported that disadvantaged groups should be given adequate representation on executive committee. There should be freedom of participation in meetings as well as decision making to the members. The provision of equal benefit sharing arrangement, along with participation of weaker groups in conflict resolution and a system of positive discrimination has also been perceived by a majority of the respondents. A significant proportion of

the population belong to poorest of the poor and concerted efforts should be made to ensure that benefits must reach these marginalized and vulnerable groups, whose role in overall livelihood strategies has not adequately been recognized in the past. Special attention should be given to the inclusion of women, landless, transhumance and nomadic and semi-nomadic pastoral communities in all aspects of watershed development and protection.

Monitoring and Enforcement

In the participatory approach, the monitoring and sanctioning are undertaken by the participants themselves and not by the external agencies. Initial sanction used for violations of the rules is generally low. The participants themselves undertake mutual monitoring and enforcement to avoid transaction costs. The cost of monitoring is low in many long enduring CPRs as a result of the rules in use and high degree of compliance. The system of rotational monitoring helps in better enforcement of regulations. If appropriators who monitor effectively are given rewards for doing a good job it will ensure better monitoring in future. In such situations, the individual who finds, a rule violator gains status and prestige for being a good protector of the commons. However, the violator loses status and prestige. Private benefits are allocated to those who monitor. When internal monitoring is accomplished as part of a specialized position accountable to the other appropriators, several mechanisms increase the rewards for doing a good job. However, monitors can be fired easily it discovered slacking off [Ostrom (1990)]. One of the serious drawbacks of watershed development programmes has been that monitoring was not attended to, in the manner, as it should have been done and that is why the physical targets could not be achieved in most of the cases. The performance, as also the realization of the objectives has been gauged only in financial terms, which has created numerous problems, very difficult to cope up with at present. The data related to measures adopted by the VDCs for monitoring and evaluation of the benefits generated through project interventions is presented in table 2.21.

Table 2.21: Measures Adopted by User Groups/VDCs for Monitoring and Enforcement								
	Project Area with VDC							
	Ramnagar				Akhnoor			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Monitoring and Evaluation of the Benefits Generated	N0.	%	No.	%	No.	%	No.	%
Holding Meeting	27.00	100.00	19.00	100.00	33.00	100.00	11.00	100.00
Creation of Manpower	23.00	85.18	12.00	63.15	16.00	48.48	4.00	36.36
Creation of Self Help Group/User Groups	24.00	88.88	15.00	78.94	27.00	81.81	7.00	63.63
Cooperation of Government Functionaries								
(I) Tehsildar	15.00	55.55	11.00	57.89	19.00	57.57	5.00	45.45
(ii) Block Development Officer	17.00	62.96	14.00	73.68	22.00	66.60	7.00	63.63
(iii) Village Level Worker	18.00	66.66	16.00	84.21	19.00	57.57	6.00	54.54
Cooperation of NGOs	23.00	85.18	11.00	57.89	17.00	51.51	4.00	36.36
Cooperation of IWDP Authorities	23.00	85.18	13.00	68.42	23.00	69.69	8.00	72.72

Since user groups and VDCs were primarily created as facilitating agents and also as monitoring agents of the project interventions, it was necessary to ascertain as to what measures did they adopt for monitoring and evaluation of the watershed development and protection activities under IWDP (Hills-II), Jammu and Kashmir. User groups and VDCs have reported to be holding regular meetings and collecting feedback from the members on their perception of the existing status of these activities. User groups and VDCs members reported that they help the project functionaries in monitoring by supplying the required manpower to attend the task. However, in actuality, the project functionaries were hiring paid local personnel for regular watch and ward of the enclosures on VCLs and forestlands. The performance of hired watch and ward personnel was reportedly very poor, even if they were employed locally. PRAs reveals very poor performance of user groups in monitoring due to lack of interest and proper awareness regarding the regular monitoring and enforcement of the regulations. They have also interacted with local government officials and non-government agencies along with IWDP functionaries for monitoring the project activities. However, in actual practice, such interactions have not been very fruitful, except the supervisory role-played by the participatory social development functionaries of IWDP.

Training Needs and Institutions

In the context of participatory watershed development, the training address not only the needs of local communities, but also a substantial amount of such measures are needed for the project staff, especially in respect of behavioral

training, which includes a range of topic such as communication and listening, sensitivity, interpersonal relations, leadership, teamwork, and so on to empower individuals and therefore enhance the quality of the outputs. It also facilitates in developing a culture of participation and sharing within and between the development agencies themselves to enable community participation to take place.

During the past, the natural resource management and other development projects have pursued a rigid approach, which has hindered experiential learning, documenting and reflecting on experiences, discussing and analyzing them, and revising and readapting the approach. Experiential learning implies different agencies working together as teams, sharing their experiences, and developing a common understanding, vision and approach. It also implies sensitivity to what targeted communities are saying and a response to their needs and suggestions in the context of natural resource management. The foundation for experiential learning can be laid in participatory workshops and meetings, in which local communities and project staff tries to arrive at an understanding of indigenous technologies and system of management developed and used by the local community. They also try to understand how the local community sees the project and how it will ameliorate the livelihood conditions. The future course of action of the project is derived from this knowledge and understanding.

The initial rural appraisal exercises are particularly important as they generate information on trends in resource use, land-based and non-land-based livelihood systems, the status of resources and patterns of their use, relationships of the watershed with the main village and neighbouring villages, and seasonal patterns of activities and events. They also provide a range of socio-economic information, which helps in participatory watershed planning. Amongst the project staff, there is a similar interaction of a participatory nature, where project staff is encouraged to interact and share their experience about watershed development with one another. This form of experiential learning has proven itself in developing a more open and shared understanding of the project, and allows

mid-course corrections or minor adjustments to be made consistently, which helps in sustainable watershed management.

If the process of participation in watershed development projects is to be accelerated, it is important to consider what types of institutions need to be involved and how to strengthen them to cater to the emergent needs of the participatory resource management. The major type of institutions such as user groups, watershed committees and local panchayati raj institutions needs to be linked and interface with each other. A common mistake in natural resource management projects is that the withdrawal process starts without building capacity of the community institutions in post project management, resulting in repeated failures of projects. The development of apex community institutions that are capable of carrying the resource management process forward on their own is, therefore, an important pre-condition for sustainability. Besides, institutions such as local government and other line departments, NGOs and funding organization are of importance. Each of these institutions has a role to play, as each one brings with it certain strengths and areas of expertise. Whatever, the type of interaction adopted, it is important that two things be given top priority: the capacity building of various institutions in participatory watershed management and steady attention to the interests of women, landless and other disadvantaged groups.

IWDP (Hills-II) has given specific capacity building support to each stakeholder in social and technical issues confronting watershed development. The common elements in training imparted by the project to different stakeholders includes the following:

Creation of negotiating platform for sustainable land use;

Long-term association with reputed NGOs to improve the skills of the staff and farmers;

Continuous on-job training to project staff depending on their background and experience;

Participatory and experiential training to the participants;

Social and technical training to the project staff and user groups in an integrated way;

Intensive and field based training to the field staff and farmers by conducting strategic workshops and evaluation exercises;

Season long practical training for project staff and farmers;

Equal opportunities in training programmes to men and the women with flexibility regarding training timings and venue;

Building up a network training team to handle the training needs in the long term to ensure sustained capacity building.

PRAs with project functionaries and user groups revealed that the farmers have been imparted training on biophysical aspects of watershed development. The project officials reported that extension activity, viz., farmers' fairs, field trips and exposure visits have provided excellent opportunities for the project officials to elaborately orient the farmers about the details of watershed management. These activities were planned and organized at sub-watershed level by the extension wing of the project. The training in the development of peoples' organization seems minimal, although VDCs and user groups are indeed covered. If peoples' mobilization for poverty alleviation through natural resources management is a key factor in the project, it may be difficult to sustain peoples' participation without appropriate attention to the farmer's organizations. The farmer's training strategy seems to be concentrated on communicating certain messages. It is not clear how successful local technologies have been integrated into this process. The farmers in the selected sub-watersheds have been provided technical training on rainfed crop demonstration, on-farm production, vegetative field bunding, terrace repair, vegetable developments, mushroom development, etc. The VDC members have revealed that since time immemorial, the farmers had been cultivating their crops by conventional methods of cultivation and the returns were far below the level where amelioration was not guaranteed. The introduction of new technology along with improved seeds and chemical fertilizers has given remarkable results. The main objective of the rainfed crop demonstration in the project was to increase the yield per hectare by

using the latest know-how disseminated by the extension staff of the project. The impact of farmers training was visible in increased production level, which was almost stagnant for many years. Likewise, other training inputs have resulted in improved performance in production and productivity.

It was felt that considerable benefits could accrue from the continued training of the field staff of the project in such topics as farmers' organization/institutional building; socio-economic aspects of people's participation; women and gender issues; participatory monitoring and evaluation techniques; quick income generation activities; techniques of rural appraisal and participatory rural appraisal; learning from farmers; and the use of indigenous technology and its incorporation in watersheds development plans. Farmers'groups/organization networking, watershed resource management professional networking, and education/training institutions will help update field staffs on the latest thinking in watershed management and farming systems. Recent research and development efforts have made in agriculture production technologies, technology generation processes, and information processing technologies, extension technologies and value-addition technologies. Each of these component technologies is extremely sophisticated, even in the field of watershed development. The farmers find the products of these technologies relevant to their diverse agro-ecological and socio-economic conditions and adopt them. Some of the recent development in these component technologies relevant to watershed development in which training can be imparted to the farmers and project staff is briefly highlighted below:

There is a continuous of paradigm shift in rainfed agriculture. Starting with the individual crop production system, the approach has evolved to cropping system and finally to farming system. Similarly, there has been an evolution in approach from simple soil and water conservation technologies to watershed development and then to renewable natural resource management. In terms of new crop and varieties, technology has radically changed from simple breeding to hybrids and more recently to sophisticated genetic engineering through biotechnology and tissue culture. In additions, there are myriad innovations introduced by farmers

on the basis of their indigenous technical knowledge, which are being recognized as having scientific value. Keeping this into view, the farmers need comprehensive training for use of these technologies in rainfed agriculture.

The introduction of plastics for improved water management, glass/green houses for temperature and humidity controls, bio-fertilizers and bio-pesticides have radically changed the pattern of technology generation. A parallel development has been seen in the field of participatory technology development. The rapid rural appraisal techniques and building on the indigenous technical knowledge through scientific inputs have contributed greatly to the procedure for technology assessment and refinement. The project staff as well as the farmers needs specific training in these areas.

The extension officers have used the traditional extension methods of mass media, for awareness creation and dissemination of new techniques and interpersonal communication to bring about attitudinal change, relevant communication and transfer of technology. In recent years, new techniques for participatory extension have gain ground. The rapid rural appraisal and participatory rural appraisal techniques combined with farming situation analysis techniques help understand farmer's perception and priorities more effectively. The communication methods have changed from interpersonal individual communication to group communication and group dynamics. Thus, skill up-gradation of farmers including farm family and farm labour for transfer of technology and community organization for empowerment of farmers are becoming more popular and essential in the context of rainfed agriculture.

Different categories of project staff are dealing with numerous activities relating to various components of IWDP (Hills-II). Often, they have to perform different functions related to social, technical and environmental aspects. Therefore, they need to have different types and levels of skills to be able to perform such a variety of functions effectively. Their training and information needs can be broadly categorized under technical, managerial, information processing, extension and training. While extension workers require these skills in all development projects, these have special significance in the context of

watershed development in view of its tremendous diversity and complexity and the fact that much of the technology has to be developed and disseminated with very active participation by farmers. Extension workers need to develop personal skills in the use of technical and managerial tools as well as management techniques and inter-personal processes.

In terms of management technique, project staff need to learn the basic project management tools, systems analysis, production and materials management and so on. They also need to develop inter-personal skills of team building, leadership, facilitation and consultancy, which would help them, respond to external demands more effectively through multidisciplinary teams and institutional linkages.

Training is an important activity of project staff. However, very few extension officers are given specialized training in training techniques and methods. While most people learn the common training methods of lecture, demonstrations and even the use of audio-visuals aids, most such training has remained one-way traffic. It is, therefore, important that project staff should be given specialized training in training methods, especially in training needs analyses, participatory training techniques and experiential learning. In order to make this training more effective at each level, it should also focus on skill up-graduation and problem solving. The skills required to impart this kind of training, such as facilitation skills, curriculum development and training needs analysis, and interactive methods and practical hands on training technique have to be developed amongst extension officers.

To ensure effective implementation of imparting the necessary skills to the project staff, it is important that the IWDP (Hills-II) should develop a policy related to human resource development and carry out training needs analysis and prepare action plans. While awareness on new technologies and technology generation methods and processes is perhaps being created through the present system of seminars and workshops, study visits, foreign training and so on, skill up-gradation should be planned through integration with industry, vendor related training and foreign training. A system of inter-institutional exchanges with

particular reference to institutions contributing to participatory watershed development would also enhance capacities and promote linkages. For other skills in management, information technology, extension, communication and training techniques, suitable institutions with specialization can be identified and long-term arrangements can be worked out for skill up-gradation of the project staff. It is also important that adequate funding for training should be provided along with a commitment to release project staff for their skill development.

IWDP (Hills-II) and Participatory Irrigation Management

As a result of the feedback received from the farmers and the investigations of their complaints and contentions, it became apparent on the part of IWDP (Hills-II) that radical structural changes were needed for the irrigation management system in the project area. Once this was established, the issues turned to alternate solutions. As these solutions had to be acceptable to farmers and required their cooperation, further extensive public consultations were undertaken. In this process, a policy framework began to emerge and continually changed till implementation modalities have evolved. Thus, the reform strategy has materialized through the process of public consultation itself, with actions taken and adjustments made in response to needs as they have arisen. Throughout the process, however, the objective of attaining a viable irrigation sector based on farmer's management has been firmly held in mind.

Community Outreach and Participation

Outreach of the community and their active participation began with the discussions on participatory irrigation management. Extensive discussions have taken place across the project area. Farmer perspectives have taken place central to crystallizing the policy thrust and programme direction. The public participation campaign has been instrumental in sustaining dialogue and fostering transparency throughout the process. The strong commitment of project implementing agency has been essential to driving the dialogue and reforms forward. The increased participation user groups, grassroots organizations and

interest groups have helped in building commitment to the reforms. The reform focus on several fronts simultaneously:

Establishment and development of WUAs across the project area;

Scheme rehabilitation and maintenance;

Full cost recovery and financial sustainability; and

An agricultural intensification programme.

Improving the Irrigation Service

The formation of WUAs and the joint 'walkthroughs', involving WUA and project field functionaries served as the basis for the subsequent first minimum rehabilitation and maintenance programme. The initial stage of participatory irrigation management encompass:

Improving the systems through enhanced maintenance and rehabilitation;

Improving water management; and

Improving agricultural practices and on-farm water management.

To begin with the most successful of these three activities was the rehabilitation and enhanced maintenance programme. Most of the works related to desilting, weeding, and raising embankments, and to a lesser extent repairing or constructing secondary level concrete structures. In the course of discussions with user groups, improved agricultural practices were identified as a further need, which include enhanced agricultural extension, dissemination of scientific information and productivity augmenting technologies on farm demonstrations, and training and skill development of project staff and WUA members.

Promotional Activities

Organizing meetings with water users was the first action carried out in project area. The purpose of these meetings was to explain the transfer programme, its advantages, and the responsibilities of WUAs. The project staff organized these informational meetings. Later, local NGOs and line departments also participated. The WUAs required clear information about the potential advantages of the transfer. Various advantages were described to the users in these meetings starting with the advantages that management by a users'

organization has over management by the government. This was a convincing argument in many areas, due to the slow response from the government agency to problems that required immediate solution. Not only were responses slow, they were also expensive. One serious obstacle to transfer was the low irrigation tariff then in force, which were grossly inadequate to cover the cost of proper operation and maintenance. Convincing water users of the need to raise tariffs was not easy. Yet users eventually accepted that they were the principal beneficiaries of good irrigation service and good maintenance of the infrastructure and so they should be in charge of it. The agreements were reached with the users to raise water tariffs gradually until financial self-sufficiency could be achieved. However, once the process started, the increases were expedited, and agreements of this acceleration were reached with the WUAs. At the beginning of the process, the users were told that the deteriorated infrastructure would be rehabilitated and the new machinery and equipment for maintaining that infrastructure would be acquired. However, the project has allocated insufficient funds to rehabilitate the infrastructure works in all sub-watersheds, and because of the financial problems, this programme has not proceeded smoothly.

Training Programmes

Various training activities were conducted as part of the transfer process. Both government staff and the farmers themselves required training in the new arrangements that had evolved with the transfer of management. The training programme for the WUAs involved the promotion of the transfer process among users and the training of the WUAs' presidents and their executive committees members. WUAs over a period of two or three years, is targeted to receive at least one round of the following types of training from the project staff and local NGOs:

Basic leadership development training encouraging leadership skills;

Systems management training including water distribution, implementation of cropping calendar, in-season maintenance, tariff collection, and conflict management, and

Financial management training including book keeping and money management.

Training is an ingredient in the overall implementation of participatory irrigation management programme. Training is critical to equip farmers and members of WUAs to carry out their new roles. In the past, WUAs by-laws stipulated annual elections of leaders; the impact of this training was limited due to rapid turnover of leadership. The training given to WUAs is of the classroom variety. Training fatigue also set in when, to cut costs, two or three training sessions are held in a single day. Perhaps due to limited resources and shortage of qualified personnel, not all. WUAs receive all types of training. This is particularly true of financial management training. WUAs that have gone beyond the initial water management activities have often succumbed to misappropriated funds. Lack of accountability and transparency of activities is a primary culprit here. However, lack of know-how in bookkeeping and money management may constitute other reasons for this outcome. If capital building is the path of the WUA viability, then providing relevant financial management training becomes critical.

Formation of WUA

WUA is the basic foundation of the irrigation reform process under the IWDP (Hills-II), Jammu and Kashmir. The process of formation of a WUA was relatively simple. The election process to form the WUAs was highly democratic and fair and was conducted in a participatory manner. The participation of the farmers in large numbers in electing the office bearers of the WUAs may be attributed to the discontent in their minds over the management of irrigation systems by the government agency and shows their desire to manage the systems on their own. Initially, WUAs have been formed in those areas where physical infrastructure for irrigation already existed in the form of water harvesting structures and small canal outlets in upper hill slopes fed by rains, which were in need of repairs and

maintenance. The participatory development staff of the project along with VDCs identified the users of water. The elections were held for the formation of WUAs, with active support of the VDCs and project functionaries. On the specified date, elections were conducted. Each voter casts his vote. The candidates securing the maximum numbers of votes were declared elected. In some cases, the elections may be unanimous. The consensus candidate was then declared elected. The tenure of the WUA is for a period of one year. Where a vacancy arises due to death or resignation of a WUA president or a member, the vacancy is filled up following the similar process. Each WUA has a separate bank account. The president and a member are the signatories to the bank account. In the context of IWDP (Hills-II), Jammu and Kashmir the project functionaries along with members of the WUAs bear a much greater responsibility and undertake the survey of the repair works to be initiated to renovate the existing structures. The project provided the funds and supervised the whole work. WUAs along with VDCs undertook the responsibility for repairing the water harvesting structures, the branch and distribution channels up to the outlets, as the case may be. The users were motivated to construct field channels beyond this level and to make necessary land leveling and improvement and other on-farm works. In order to achieve the cost effectiveness, most of the works related to the construction phase have been entrusted to the members of the WUAs and VDCs. The users and their associations (VDCs and panchayats) have played a significant role in every phase and bear a larger responsibility both for construction and motivated the villagers to share the costs in the form of voluntary labour contribution. Since labour is the principal resource needed for the repair of these works and account for the bulk of the costs, the mobilization of resources principally takes the form of labour contributions by members of the WUAs. The efforts have also been made to engage the local labour, which have created the much needed wage employment and contributed towards raising their livelihoods. The costs of work are supposed to be recovered from the beneficiaries in the form of ‘betterment levies’, in easy installments over a period of several years.

Before the project, the farmers were not required to put in any effort (in kind as well as in cash) to get water from surface irrigation systems. The government agencies identified the projects, prepared the designs, constructed the system right up to farm gates and also maintained the same. Thus, the government agencies were playing the role of provider, controlling all the operations and the farmers were left only with the role of beneficiaries. In such a situation, there was little incentive for the farmers for any collective action. Hence, they preferred easy methods of getting water through maintaining a better relationship with the field functionaries or pleasing them either through social influence of 'palm greasing'. The farmers, moreover, were voiceless in framing the rules and procedures for water distribution. Further, in contrast with the pre-independence era, the general tendency of the populace is to depend for everything on the government. No initiative comes from the people and, if it does, it is cater to political ends. The participatory development functionaries of the project have kept these facts in mind and highlighted these during the PRAs with the farmers. The advantages of WUAs were clearly explained to the farmers. The participatory development staff of the project has played a vital role in educating and motivating the farmers in evolving WUAs.

The participatory irrigation management was introduced under IWDP (Hills-II), Jammu and Kashmir to involve the farmers at every stage of management of irrigation systems in the area of the operation of the WUAs. The PRAs reveals that the farmers feel that they have an equal say in management of their affairs. They have participated in the execution of the works by providing labour and attending to the execution of the works for maintenance of the system. However, it was also observed that the president of the WUAs were taking keen interest in execution of the repair works rather than the territorial constituency members and members of the WUAs. Political interference and groupism may be the separating force, which may in future hinder the unity and participation of members in sharing their responsibilities in the management of the irrigation system. A number of powers have been devolved to the WUAs. At the primary level, powers like maintenance of the irrigation infrastructure, resolution of

conflicts, record keeping etc. have been delegated. There is accountability of the irrigation wing of the project towards the WUA. However, the members of the WUA are of the opinion that they should be given every opportunity in the management of the main system otherwise reforms will be incomplete.

Operation of Irrigation System

In the selected sub-watersheds, WUA is a simple organization and manage all the tasks with the assistance of their own members and participatory development functionaries of the project. Indeed, considerable knowledge and experience in handing both the technical and social problems of water management are essential for smooth functioning of user association. Most of the members of WUA are not professionally organized, but they are skilled and specialized personnel to manage the technical task, and trained in managing day-to-day tasks of running the system. There is no provision of paid and full time staff to handle both technical and routine administrative tasks. The project role is limited to supervising the maintenance and operation of the water control system at the level of reservoirs and main channels. The field channels constructed with local resources and initiatives are managed locally with their own personnel. The project functionaries are expected to strengthen their skills by organizing capacity-building programmes through the involvement of local NGOs. To begin with, the entire reform process has been repair and renovation oriented, with jobs including repairs, system rehabilitation, desilting works, etc. The majority of the works have been done through WUAs along with VDCs. WUAs have executed the works in a fair and impartial manner, with proper records of all financial transactions maintained, and contracts given in a fair and just procedure. In general, the cost of the works done by WUAs is 25 per cent lower than those carried out by the contractors. Most of the works are done at the estimated rate. This is in sharp contrast to the ad hoc manner in which the irrigation agency paid for operation and maintenance. The WUA president along with some members and project officials has identified the required works through a walk-through survey. These works were then discussed in an executive committee meeting

and then passed on to the project functionaries for preparation of technical estimates. An agreement was signed between the project officials and the WUA president. A part of the sanctioned amount was paid in advance and remaining on the completion of the works. But in majority of the cases, even after the completion of the works, the balance amount was not paid. Whatever funds were released go directly to the WUA account. The project officials have no role in handling the funds. Proximity to the process of technical and financial estimates, funds disbursements, works execution by the local farmers, have all brought more transparency in WUA functioning. Contractors were almost out of the picture, saving on this alone was about 25 per cent.

The project authorities have given clear instructions that there will be no new structures, or alteration of original designs. So, the major emphasis is on restoring the original designs. The repairs and strengthening of structures, adding of missing structures, desilting the structures, installation of water regulation structures wherever damaged or not installed earlier, and strengthening the distribution channels and bunds are some of the major works carried out by the WUAs. In the process of users identifying and executing the works in case of drainage system, a lot of attention has been paid on users' needs like cattle pathways, bathing steps for women, removal of encroachments and clearing shrubs and silt for smooth flow of water till the tail-reach. Likewise in the case of water-harvesting structures, in addition to the above-mentioned works, the major focus was on repairing and strengthening the existing infrastructures, raising and strengthening tanks bunds to original designs, and improving the water-harvesting structures. In many cases, users have contributed their share as voluntary labour. In some cases, the president of WUAs have been trapped in difficulties owing to lack of proper manpower and material planning, which resulted in severe losses to them.

In many cases, the WUA president being a dominant person acted as a contractor and took on the works himself resulted in the siphoning off funds or sub-standards works. Because of his position and fear no one in the WUA complained. As the officials have to pass the bills of the sanctioned works, the

compliance with the president has increased their rent-seeking behaviour. In order to curb this in future, more awareness campaigns need to be launched regarding the rights as a salient feature of the programme. The participatory monitoring and evaluation processes have to be set in place and accountability pressure on both the project functionaries and the farmers' organization has to be increased. On the whole, the farmers feel more empowered now and a sense of belonging has been promoted. The dependence on contractors has been reduced very significantly. The construction works have been executed by the WUAs for a lesser costs than charged by the contractors earlier, which help reduce the transaction costs.

Allocation Rules

The construction of water control works is essentially one time or, at most, an intermittent activity. However, their operation involves tasks of a continuing nature. The operation aspects are necessary to ensure that physical facility such as dams, canals, field channels and structures are maintained in good working condition and regulate access to facilities provided by it. One of the crucial factors on which the authority and credibility of the WUA depends is its ability to ensure that equitable distribution of the benefits takes place and any free rider is penalized. Towards this end several rules have been formulated. One's share of water is determined by the land acreage. This ensures an equitable distribution of the common resources and the prevention of the free riding. In addition, members also patrol together in order to avoid any breaching of the channel. The enforcement of the rules and making sure that whatever penalties are imposed are paid is an arena for the WUA to prove its authority and impartiality. The willingness to enforce the rules without fear or favour is an important means of maintaining the credibility, respect and allegiance of the members. In the present context, as the water systems are set up by the user community with cost sharing in the form of labour contribution, there are provision for some form of compromise regarding the balance between 'efficiency' and 'equity'. In order to minimize the potential for conflict in the course of operation, there is use of

system of physical rationing of the area irrigated (both total and by crop) and of the amount of water supplied to particular crop in the light of available total supplies.

In the project area, irrigated water is used essentially for paddy cultivation. The extent of area to be cultivated as well as the timing of the start of irrigation in a particular season is generally decided by the users' association as a whole in the light of available water supply and rainfall at the beginning of the season. As the entire service area cannot be irrigated, the system is confronted with the problem of rationing supplies. The mechanisms have been evolved to ensure equitable sharing of the shortfall in supplies among all users. Acreage rationing is but one element of the water rationing system. In times of shortage, besides rationing acreage, the water allocation is regulated even more strictly. It is significant to note that because of severe water scarcity in the selected sub-watershed, the irrigated water is available mostly in the raining season and thus, the amount of rainfall in a particular year also influence the allocation of water and/or rationing system adopted by users association. It is ensured that all users share the reduction in both area and water supply in more or less the same proportion. As paddy is relatively water intensive crop grown in the project area, a system of rotational use of water is adopted even in a normal year to permit all users to grow the crop. The collective decisions are being taken at the beginning of the season regarding which land and how much is to be cultivated, which implies certain coordination in the timing of operations. Thus, in the selected sub-watersheds, users' association is responsible for the overall management of the system, and makes the allocation decisions within the framework of principles established by convention and supervises its implementation.

Maintenance of Irrigation System

The purpose of 'maintenance' is to ensure that physical facilities function smoothly and at the level of performance for which they were designed. Typically, in a surface water system this involves periodic inspection of the facilities to identify the deterioration (such as leaks in embankments, erosion,

silting of structures, silting of channels, growth of weeds, etc.) and execute the necessary repair. Besides, the organization needs to be alert in identifying major malfunction as they arise and have the capacity to correct them promptly. If the maintenance is inefficient, the volume of water made available to the fields get reduced, which hampers the level of output in relation to the potential of the system. The quality of the maintenance affects the interests of both the organizations a whole (which is presumably interested in getting the maximum production with the available water) and the users (whose output and incomes are directly affected by it). The strength of this common interest is stronger in the present context, as the users have made a substantial contribution to the cost (voluntary labour contribution) of developing it. The common interest of user organizations is also strong, where the neglect of maintenance leads to heavy loss in productivity. WUAs have established conventions regarding the timing of repairs division of work, responsibility of members and the obligations of users. The custom and social pressure facilitates the smooth working of the arrangements. However, they do not work entirely on the strength of mutual interest reinforce by custom. There is provision of sanction (ranging from fines to loss of water rights) against non-compliance, for which WUA has the authority to enforce the sanction to ensure compliance. However, not even a single case has been reported of sanction against non-compliance. The large landowners have dominated the WUA functioning, as they cultivate a large proportion of land benefits relatively more from the irrigation system. Thus, the land tenure system has very closely influenced the management of local water control systems.

Benefits and Costs

There are legal impediments to local initiatives in constructing small irrigation and water harvesting structures. Under the existing law, all rivers including streams and rivulets are government properties. No individual or village community can use them to store water without the permission of the government. The present restrictions on small and purely local works should be substantially reduced in the interest of promoting watershed development. Project has made a modest

attempt to involve the users community in managing the water resource at sub-watershed level. The project has also evolved the mechanism of sharing of costs and benefits, which is essential to generate people's participation and contribution as well as minimizing the transaction costs of institutional change. In the project area, every landowner had an equal share in water and got the water in proportion to their land holding. The landless villagers have no stake in WUA; thus, complete equality is not necessary for the success of collective action. Viable collective institutions are feasible provided all parties are persuaded that the institutional change will make them better off in some way and that the rules regarding the maintenance and use of common resources are properly defined and enforce. The quality of local leadership is, therefore, a critical factor.

Under IWDP (Hills-II), Jammu and Kashmir, the potential beneficiaries in the selected sub-watersheds has been mobilized on issue related to fair sharing of the benefits and costs. It was emphasized that users' participation will result in cost-effectiveness in repairs and maintenance and efficient management once it is commissioned. Since a part of the cost of resource development and operation mainly in the form of labour contribution is to be borne by the potential beneficiaries, they have been keen interest in minimizing the costs, ensuring a fair balancing of competitive interests and providing economical and efficient services. The users' participation and their direct financial stake in the system ensure that the projects are designed well, constructed speedily and economically, and provide efficient service. Even if the rules are clear and applicable in practice, uncertainty remains about costs and benefits to individual beneficiaries due to inadequate knowledge about the impact of the investment. This may be attributed to wide variation in individual circumstance such as difference in land quality, access to inputs and know-how, and the ability to afford the necessary inputs. There is also uncertainty with regard to timing and quantity of water supply available in any particular season. Besides, land tenure status has also its influence. For example, owner-cultivators' assessment of the benefits of joining WUA will differ from that of a tenant. The uncertainty in the over all supply of water is difficult to deal with. However, existence of well-defined rules

of allocation and their application in practice would make a significant difference, which depends on the credibility of the functionaries of WUA and their ability to discipline violators of rule and enforce compliance. The involvement of large and medium farmers who also stood to benefit directly from such investment has been one way of giving strength and credibility to users association. As a larger chunk of the benefits goes to large land owning groups, who may also a have the capacity to motivate the small landholders to contribute their share towards the development of the system. However, the equitable distribution of benefits from collective action has been by no means easy or conflict free; which call for direct and active intervention by the project functionaries, at least for initial period.

Equity and Conflict Management

The members of the WUAs reported that there was provision of equitable distribution of water based on the size of land holdings in the area of their operation and this has been adhered to in actual practice also. However, there was an unscrupulous distribution here and there, and conflicts occur among the users and members of users' association over the way allocations are managed and over attempts to violate the allocations. In such situations, the executive committees of the WUA mediate disputes among its members. Disputes that cannot be resolved at WUA level are referred to village panchayat. The conflicts, which cannot be resolved by the WUA as well as panchayat, are referred to project officials. It does not however follow that the latter will always intervene decisively.

Transparency and Accountability

Transparency is one of the key principles of participatory irrigation management. In order to strengthen confidence over the functioning of the farmers' organizations, the activities undertaken by them have to be informed to all the water users in the area of their operation. The participatory appraisal exercises reveal that farmers have been informed in advance by the WUAs about the various activities to be undertaken. The management committees of the WUAs were disseminating information on various activities undertaken for efficient

management of the irrigation systems in the area of their operation. The dissemination of information was through general body meetings on regular intervals. A walkthrough survey has been undertaken to prioritize the repair works on the system so that the available funds should be utilized precisely. Keeping in view the limited amount of funds available at their disposal, the prioritization of the work was also considered necessary by the majority of the farmers. After the introduction of reforms, the quality of the works undertaken by the WUAs were comparatively better than the quality of the works undertaken by the contractors prior to the system of participatory irrigation management. The conveyance losses in the distribution channels have been minimized, which facilitated in distribution of water up to the tail end area. A majority of the farmers reported that the WUAs have utilized the allocated funds precisely by prioritizing the works through walkthrough survey. Thus, the procedure laid down by the government project functionaries in utilization of funds was strictly followed by the WUAs and also in undertaking the minimum rehabilitation of the systems. With the initiation of reform process in irrigation management, the project functionaries are playing the role of facilitators and made accountable and responsible to the farmers' organizations. On the other hand, the executives of the WUAs are also accountable to their members. The provision of re-election of the WUAs at regular interval also ensured the downward accountability in the reform process.

Environmental and Economic Impact

The institutional changes initiated under the IWDP (Hills-II), Jammu and Kashmir has resulted into significant changes in the management of irrigation system by evolving participatory approaches through the formation of WUAs. The environmental impact of the reform process is difficult to assess. The farmers have reported that levels of salinity in the soil and water had declined after the project intervention due to improvements in water distribution. Due to repairs and improved maintenance, more water has been reaching the tail end areas and is used for flushing the salts from the soils. The incidence of water logging has also been declined significantly with cleaned and improved drainage system. There

are perceptible economic gains to the farmers in the selected sub-watersheds after the initiation of participatory irrigation management by forming farmers' organizations. The land values have increased in both forested as well as agricultural sub-watersheds in the range of 10-15 per cent. Increase in the land value especially in forested sub-watersheds may be due to the fact that after the farmers' organizations, the land, which was not receiving water, was assured of irrigation water. The irrigated land value was marginally more in agricultural sub-watersheds due to the field drainage provided by the WUAs, which also arrested the waterlogged conditions in the area of operation of the WUAs.

The formation and operationalization of the WUAs have resulted in an increase in area under cultivation and ensure timely sowing of crops and receipt of water at the tail end. New acreage has been added to irrigate agriculture due to better coverage and maintenance. As a result, irrigated area has increased mainly in tail-reaches by 10-15 per cent. The project has provided financial support to the WUAs for the operation and maintenance of the participatory irrigation management. With better maintenance of the irrigation system, the availability of water for various crops has increased, which resulted in increased productivity in terms of rice, pulses, vegetables and orchards ranging between 10-25 per cent. The farmers were confident of getting water supply at the different stages of the crops. The extension workers have also educated the farmers regarding the economic use of water for increasing production. Hence, the increase in productivity of different crops may be attributed to the effective involvement of farmers in the participatory irrigation management. After the formation of farmers' organizations, the level of income derived from various crops in the selected sub-watersheds has increased significantly as compared to the income levels in crops grown prior to the formation of WUAs. The rate of increase in income has been reported to be comparatively higher in rice and vegetables than other crops. It is important to note that the area of operation of WUAs was under the rice-growing belt, and the farmers reported that the cropping pattern might conveniently be shifted to some extent to commercial crops like vegetables and pulses, which may assure higher returns in future.

The idea of collective action amongst the users is gaining momentum. The repairs and maintenance works have generated much needed wage employment for the poor labourers and small and marginal farmers in the area. The undertaking of the construction works by the members of WUAs along with VDCs have resulted into cost-effectiveness to the tune of about 25 per cent in certain cases. The institutional reforms in irrigation management have also empowered the farming communities in self-organization and equipped them with the supervision and management skills. The farmers' participation in various stages of the reform process has created a sense of ownership of the assets created. They have played a greater role in the choice of prioritizing and executing the work themselves through the own organizations. Above all, the institutional changes facilitated the closer interaction of the government project functionaries and local stakeholders and unified the diverse groups around the water.

In nutshell, all the WUAs in the selected sub-watershed have taken up the maintenance activity with the financial support provided by the project. Due to physical improvements in the irrigation system, the water availability has improved. However, detailed operational plans are still missing, which needs to be pursued further. The sustainability of the WUAs essentially depends on their capacity to operate and manage the system on their own and equitably serve all the members. One of the important factors is to convey the water to various points within the operated area. For this, the distribution network needs to be made functional by way of removal of silt, vegetation, repairs of structures, strengthening the bunds, etc. The financial sustainability has an important role in the sustainability of the WUAs. At present, WUA is completely dependent on the project functionaries for funds. The physical works will continue for some time, which would provide some finances for the day-to-day functioning of the WUA. But what happens when the funds from the donor stop. In the past, in other parts of the country where WUAs were formed, many became defunct due to financial bankruptcy. WUA will have to be financially self-sufficient to perform their duties on sustainable basis and to make the reform process a success. In the near future, it is envisaged that the WUAs will collect water charges from the users.

This will be the most logical step in the reform process. However, the WUA executives may not be able to perform their duties in this regard due to inadequate manpower at their disposal. In order to operationalize the task of water tax collection, concrete steps need to be taken. The steps need to be initiated to strengthen the capacity building of WUAs to ensure financial sustainability, after the withdrawal of the project.

By and large, the functioning of the WUAs is reported as transparent and the members are accountable to the users. There is provision of regular meeting of the WUAs. However, it seldom held regularly. The sustainability of the farmers' organization also calls for involvement of NGOs and training institutes in upgrading the skill and capacity building. Some attempts have been made in this area; however, the involvement of NGOs is very meager. There is urgent need to forge suitable linkages with reputed local NGOs, training institutes and line departments to equip the farmers' organization in various aspects of participatory irrigation management. No doubt, adequate groundwork and the required environment are created, there is need to give a closer look to the weaknesses and remedy them. More importantly, a regular monitoring mechanism has to be put in operation to initiate corrective measures

Constraints in Participatory Watershed Management

During the process of operationalisation of participatory approaches, several constraints have been encountered. Some of them are: inappropriate criteria for community selection, community conflicts and infighting, presence of other programmes and projects with softer eligibility criteria, inadequate training in accounts and record maintenance, poor credibility of some executives on VDC, lengthy project procedures, security related problems in some areas, political interference and nepotism. User groups were not given adequate representation on VDCs. As a result, user groups may be unable to directly influence the decision making process in terms of the watershed development related activities undertaken by the VDCs. It has been reported that the project functionaries at sub-watershed level have actively been imparting extension services in the

transfer of technology for watershed management. However, their role in strengthening the VDC and in the integration of traditional knowledge with improved technological option is not fully satisfactory. The government functionaries considered the implementation of a project intervention is their main responsibility. The perception of VDC members regarding constraints in participatory approach in watershed management is presented in table 2.22. The constraints are grouped into policy constraints, institutional constraints, attitudinal constraints, informational constraints, etc. It has been reported that limited opportunities have been given for participatory management in case of about 40 per cent of the VDC members in forested watersheds. About 27 to 47 percent of the VDC members have not been provided the opportunities in participatory management in agricultural watersheds respectively in Akhnoor and Ramnagar. A large proportion of the VDC members across the selected sub-watersheds reported lack of clarity in participatory action and devolution of rights and responsibilities to members. There has been lack of openness and accountability as well as weaknesses in the implementation procedures. The traditional local institutions have reportedly been weakened with the emergence of new institutional arrangements under the project. There have also been complaints of biased approach towards particular area and community, which have created a deep sense of mistrust.

The information flow was also inadequate and project functionaries were charged with a tendency to keep the information hidden, which have hampered smooth participation of the villagers in various activities. The VDC members representing disadvantaged groups have complained regarding drastic curtailment of essential survival activities due to creation of enclosures on VCLs and forestland. A widespread feeling of hostility among the members has been reported due to inadequate benefits from the resource conservation and protection activities. Further due to lack of inter-agency coordination, field functionaries have not properly attended the vital issues like institutional building, capacity building, financial strengthening and income generating activities. PRAs revealed that most of the members of VDCs are enlightened or innovative farmers and it has

been observed that there could be a tendency for them to take over the presidency of VDCs, as they will often be relatively larger and more influential farmers with time to do this. On the other hand, the existing executive committee members reported that watershed development and protection activities are consuming most of the time and mostly unpaid in nature, so the withdrawal tendency may be high. While the role of the innovative farmer in the Green Revolution has been significant, the same may not be entirely true in the uplands and other rainfed areas, since their achievements may not be replicable. Thus, care needs to be taken that IWDP (Hills-II) (which works in fragile areas where most of the local stakeholders are small or marginal farmers or landless), does not repeat the negative aspects of the Green revolution and the transfer of technology model of extension.

Table 2.22: Perception Regarding Constraints in Participatory Approach in Watershed Management

	Project Area with VDC							
	Ramnagar				Akhnoor			
Constraints in Participatory Approach	Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Policy Constraints	No.	%	No.	%	No.	%	No.	%
Limited Opportunities for Participatory Management	11.00	40.74	9.00	47.36	13.00	39.39	3.00	27.27
Lack of Clarity in Participatory Action	12.00	44.44	7.00	36.84	14.00	42.42	3.00	27.27
Lack of Clarity in Setting Rights	17.00	62.96	13.00	68.42	12.00	36.36	6.00	54.54
Lack of Devolution of Rights and Responsibilities	20.00	74.07	12.00	63.15	24.00	72.72	8.00	72.72
Institutional Constraints								
Weaken Traditional Local Community Institutions	24.00	88.88	16.00	84.21	28.00	84.84	9.00	81.81
Lack of Openness and Accountability	23.00	85.18	16.00	84.21	26.00	78.78	8.00	72.72
Weaknesses in the Implementation Procedures	19.00	70.37	13.00	68.42	19.00	57.57	7.00	63.63
Attitudinal Constraints								
Biased Approach	17.00	62.96	9.00	47.36	11.00	33.33	8.00	72.72
Deep Sense of Mistrust	16.00	59.25	11.00	57.89	16.00	48.48	6.00	54.54
Informational Constraints								
Lack of Adequate Information	13.00	48.14	11.00	57.89	19.00	57.57	7.00	63.63
Tendency to Keep Information Hidden	13.00	48.14	11.00	57.89	19.00	57.57	7.00	63.63
Negative Impact of Participatory Action on People								
Drastic Curtailment of Essential Survival Activities	12.00	44.44	8.00	42.10	16.00	48.48	5.00	45.45
Widespread Feeling of Hostility due to Inadequate Benefits	11.00	40.74	9.00	47.36	18.00	54.54	7.00	63.63
Lack of Inter-Agency Coordination in								
Institutional **B**uilding	21.00	77.77	11.00	57.89	22.00	66.60	8.00	72.72
Capacity Building	19.00	70.37	9.00	47.36	24.00	72.72	9.00	81.81
Financial Strengthening	23.00	85.18	14.00	73.68	24.00	72.72	6.00	54.54
Income Generating Activities	22.00	81.48	13.00	68.42	28.00	84.84	10.00	90.90

In the context of watershed development programme, gender relations are quite significant. Watershed management programme will only achieve sub-optimal results if gender relations are not considered. Agriculture, forestry and other natural resource interventions have overlooked the women beneficiaries. The

watershed professionals seemed to be unaware of the full level and dimensions to which women contribute to agriculture, forestry and other natural resource management activities. The women's role still appears to be marginalized. In the forested watersheds, women play a major role in agriculture. In agricultural watersheds also, their role is at least as important as that of the men. It is important to treat the women as farmers rather than domestic workers only. It should be recognized that the women farmers' outlook is likely to be substantially different from that of men farmers and if this can be accepted then a fresh look at the activities being funded by IWDP may be justified. It is desirable to give them a major representation in farmers groups. In the planning process, no assessment of the indigenous forms of farmers' organizations and their traditional institutions appears to be made. Thus, farmers' traditional institutions seem to have been excluded from the planning process. Therefore, the VDC may be in danger of becoming a replica of village panchayat system, which has been a political rather than a development body. The existing monitoring and evaluation system seems to very inefficient in improving the activities of VDCs and for effective administration and control of the project.

Conclusions

Participatory approaches have come into existence having felt the need for collective action to regenerate watershed resources to meet consumption needs, or to gain access to such resources for economic empowerment to emerge from existing social oppression. The participatory approaches have been evolved by the project and not self-initiated. The strengthening of participatory approaches in the formative years involves a great deal of efforts on the part of project implementing agency and local stakeholders including villagers, political leadership and NGOs. Over the period, participatory institutions have gained confidence and build their capabilities; they diversify their activities and have become more self-reliant. In project area, VDCs have a two-tier structure: the general body of its members, and the executive committee, which has representation from the hamlets/caste/clans/caste groups. One-third of women

have been inducted which are mandatory under the existing provisions. VDCs met at least once a month. The organizational structure and practices of VDCs reflect the reverence for collective wisdom of its members as well as their democratic action and management of common resource such as village common lands (VCLs), water resources, pastures and forestland. The creation and maintenance of closures on VCLs and forestland, and repairs and maintenance of water distribution channels and water harvesting structures with the object of meeting their needs have been the primary activity of user groups and VDCs. This initial activity has inculcated a sense of ownership and collective responsibility among members. The system of paid watch and ward has been in place to monitor the resource conservation and regeneration activities and the members of the user groups have also participated in monitoring the resource use, though indirectly. User groups have evolved their own norms for the resource use and monitoring and enforcement, for which VDCs along with project functionaries, have played a decisive role. The norms evolved by the user groups reflect inter-household equity on items of common interest. Besides, they demonstrate their capacity to manage resource use.

In order to operationalize the idea of cost sharing, beneficiaries have contributed voluntary free labour towards watershed development and protection activities. However, their role in such activities has been limited by the project control over both funds and implementation. Together with watershed development and protection activities, other related and integrated development activities have served to provide income and employment, increase resource productivity and address member's needs and sustaining their interest. Benefit sharing has largely been determined by the local conditions and needs of the people, the objectives of the participatory institutions and the perceived importance and priority of the benefit. While individual economic and materials benefits have been starting points for collective action, they also served to sustain member's interest over time. Project has been giving emphasis to create collective fund to serve members' credit needs and to generate employment opportunities. The exposure of a participatory institution to conflicts of different kinds and its ability

to deal with them has been related to the degree of interaction with outside agencies. There has been lack of representation of some of social groups in user groups and VDCs. In some cases, participatory institutions have given heed to the special needs of disadvantaged groups, and ensuring such recognition in their collective forums. However, inequity remains which calls for positive discrimination in collective actions.

CHAPTER – III

Environmental And Economic Impact Of Participatory Watershed Management

Watershed management and development is a top priority in the agenda of the Government of India as well as the World Bank. Watershed development and protection will also address the issues receiving special attention by the World Bank, including resource conservation, poverty alleviation, equity, gender issues, environmental protection, and overall improvement in livelihood conditions of the rural population. Long-term solutions to rain-fed agriculture lie in the conservation and efficient utilization of watershed resources [Jain (1997)]. Watershed management is the only way to conserve and utilize land and water resources, and some efforts have been made in this direction under the World Bank funded Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir. The project intends to rehabilitate the degraded CPRs as a potential strategy for poverty alleviation and livelihood improvement. Besides, environmental rehabilitation and improving the productive potential of the Shivaliks, the project also intend to meet the fuel wood, fodder, minor forest produce and other requirements of the rural poor inhabiting the selected sub-watersheds. Thus, the objective of poverty alleviation emerges very clearly as a concomitant of the objective of environmental rehabilitation. Keeping above in view, in the present chapter, an attempt has been made to assess the environmental and economic impact of watershed development and protection under new institutional arrangements in the context of IWDP (Hills-II), Jammu and Kashmir. In order to make a comparative study, the environmental and economic impact has been examined under different institutional arrangements viz., where Village Development Committees (VDCs) have been created, as well as ‘project’ and ‘non-project’ villages and in the context of both “forested watersheds’ villages and agricultural watersheds’ villages”.

Watershed Development and Protection: Achievements

The watershed development and protection component of the project aim at promoting proven locally adopted technologies and mechanical structures through active beneficiary involvement to conserve water and reduce soil erosion. Broadly, the treatments undertaken in the project components are: (i) Activities for arable land including contour vegetative barriers, terrace repairs and vegetative reinforcement, vegetative field boundaries, silvi-pasture, rainfed horticulture, farm forestry, on-farm fodder production, rainfed horticultural demonstrations and rainfed cropping system demonstrations. (ii) Activities for private non-arable, common and forestland including vegetative/shrub barriers in contour trenches, pasture development, silvi-pasture, afforestation, drainage lining, gully stabilization, with wire crates with vegetative support, stream bank protection, water harvesting structures and village ponds, roadside erosion control and landslide treatment. (iii) Other activities including livestock improvement and animal husbandry practices, rural infrastructure development (roads, buildings and marketing centre). All these activities are being promoted by using a variety of methods accomplished by strong stakeholders' participation including a number of mechanical and vegetative measures for watershed development and protection, improved livestock management, rural road rehabilitation and institutional strengthening [IWDP, Hills-II (2001)].

The project is being financed with the World Bank assistance of US $ 39.80 million equivalent to Rs. 198.00 crores. Accordingly annual action plans for the year 1999-2000 and 2000-2001 were formulated and approved by the Project Steering Committee to the tine of Rs. 25.00 crores and 40.00 crores respectively. Against the cumulative releases and beneficiary share the amount comes to Rs. 69.29 crores ending March 2001, out of which an amount of Rs. 66.67 crores stands incurred inclusive of beneficiary contribution, on broad range of activities undertaken. More emphasis has been paid on the cost-effective vegetative technologies under various sectors like agriculture, rainfed horticulture, silvi-pasture, afforestation in forest and village common lands (VLCs), and drainage line treatment. During 2001-2002, Rs 60.00 crore has been released and a target

of 17836 hectares of land treatment under arable and non-arable category has been envisaged. Besides, drainage line treatment, erosion control measures, rural roads, building, potable water supply, livestock development, institutional support and institutional strengthening programmes have also been initiated [IWDP, Hills-II, (2001)].

Arable Land Treatment

The State of Jammu and Kashmir is primarily an agricultural economy. About 61 per cent of its population is dependent on agriculture to eke out their livelihood directly or indirectly, contributing over 40 per cent to State Domestic Product (SDP). The State is mostly hilly, crisscrossed by lofty mountains and having low industrial base. The State has large proportion of population living in remote, inaccessible, isolated and economically backward region. The complete dependence on natural resources has forced the people to over-utilize the watershed resources, thus resulting in large-scale deforestation and ecological degradation. Watershed development and protection is the immediate need to restore the productive potential of the ecologically fragile Shivaliks and Karewas. The agriculture component of IWDP (Hills-II) is an important aspect in consistence with the objective of the project, contributing largely in achieving the goal of poverty alleviation through ecological improvement in the selected sub-watersheds.

The technical and non-technical inputs provided under the project includes: (i) provisioning of fertilizers, seeds and pesticides for rainfed demonstrations on cost-sharing basis; (ii) training and demonstration specifically organized for women; (iii) continuous surveillance by extension staff; and (iv) supply of improved implements, seed bins and containers to the beneficiaries. Most of the farmers living in the selected sub-watersheds have received input at least once on farm rainfed demonstration. These demonstrations have successfully promoted the introduction of improved varieties, seed treatments, appropriate application of fertilizers and pesticides agriculture implements and other improved agronomic practices to ensure moisture conservation.

Likewise, horticulture plays an important role in alleviating the social and economic conditions of the people living in hilly and rainfed areas of Shivaliks. The horticulture sector provides better potential to increase productivity and employment and thus rural livelihood diversification is the ultimate outcome. Under IWDP (Hills-II), the activities initiated in this sector includes: rainfed horticulture demonstration; supply of plant material, which are drought resistant having versatile adaptability; introduction of new varieties and species of fruit plants; step-up of rejuvenation programme and improvement of top-working, budding and grafting of existing fruit plants of indigenous type; training and demonstration for treatment against diseases; and supply of spraying and pruning equipment on cost-sharing basis.

The performance of interventions made under the component of arable land treatment in agriculture and horticulture sectors is highlighted in tables 3.1 and 3.2. Prior to project intervention, the small and marginal farmers were reluctant to use improved technical know-how. Large proportions of farmers were using conventional agricultural production methods. The major impediment in the introduction of high yielding varieties (HYV) of crops was non-availability of sufficient moisture at the time of sowing. The implementation of project interventions related to soil and moisture conservation has facilitated the farmers in timely sowing and using adequate doses of chemical fertilizers. Various training camps have been organized to disseminate the scientific technology from laboratory to the farmers' fields. These training camps have been organized in the selected sub-watersheds in collaboration with agricultural universities in the State of Jammu and Kashmir. The exposure visits have also been organized and the farmers drawn from across the selected sub-watersheds were exposed to latest agricultural technologies in Krishi Mela at New Delhi, where these farmers had ample opportunities to interact with farmers from other parts of the country.

During 1999-2000, 180 hectares and 160 hectares of arable land have been exposed to rain fed crop (R. F. C.) demonstration respectively in the sub-watersheds of Ramnagar and Akhnoor. In the year 2001-2002, a very rapid

increase has been recorded in R. F. C. demonstration, which stood at 280.6 per cent in Ramnagar and 87.5 per cent in Akhnoor. The off-farm fodder (O. F. F.) production has received modest attention initially in Ramnagar, where 60 hectares of arable land has been covered, whereas, in Akhnoor O. F. F. production has received scanty attention, which may be due to better availability of fodder from existing sources/farmers' own land. However, O. F. F. production has received no attention in Ramnagar and very negligible attention in Akhnoor in the year 2001-2002 (See table 3.1). The vegetative field bunding has received the much-needed attention of the project. Initially, 100 hectares of arable land has been treated for vegetative field bunding in Ramnagar sub-watershed and the figure for the sub-watershed of Akhnoor stood at 160 hectares. In the year 2001-2002, the coverage has been doubled in both the sub-watersheds, which have contributed significantly in improving soil moisture quality and protected the erosion of agricultural field bunding. The terrace repair has also been given adequate attention. The system of agro-forestry has been implemented in both sub-watersheds, however, greater attention has been paid in Akhnoor, as it is predominantly agricultural watershed, where common property resources such as village common lands (VCLs) and other grazing and pasture lands were severely degraded before project intervention.

The silvi-pasture activities have been implemented initially, but not laterally. The system of mushroom cultivation has been introduced in the sub-watershed of Akhnoor in a significant way, whereas the climate of Ramnagar is more conducive for mushroom development, where it has not been attended in desired way. Besides above, improved tools and implements have also been provided to the poor farmers on cost-sharing basis in the sub-watershed of Akhnoor, whereas the provisioning of modern agricultural tools and implements has not been made in Ramnagar. Actually the sub-watershed of Ramnagar is predominantly forested and the poor farmers mostly use self-made wooden implements in agricultural operations because of easy availability of wood from the local forests. The wooden agricultural tools and equipment are not as efficient as the factory made iron tools and equipment. At the same time, heavy

dependence on forest resources for agricultural tools and equipment also add to the problem of deforestation. Thus, there is urgent need to propagate and popularize the use of factory made iron tools and implement in agricultural operations, which would help in restoring the degraded forests.

Table 3.1: Achievements of Watershed Development and Protection (Arable Land: Agriculture) in Sample Sub-Watersheds (Rs. in lacs)

		1999-2000						2001-2002						Ramnagar Change		Akhnoor Change	
		Ramnagar			Akhnoor			Ramnagar			Akhnoor			1999-2000 to 2001-2002		1999-2000 to 2001-2002	
Component	**Unit**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy. %**	**Fin.%**	**Phy. %**	**Fin.%**
Arable Land																	
Agriculture																	
R.F.C Demonstration	Ha.	180	9.22	27.939	160	4.72	13.88	685	16.9	65.8	300	24.78	58.224	280.6	82.75	87.5	425
O.F.F Production	Ha.	60	1.18	3.5758	5	1.12	3.294	0	0		5	0	0	-100	-101.7	0	-100
Vegetative Field bunding	Ha.	100	0	0	160	3.84	11.29	200	5.25	20.5	329	8.98	21.1	100	525	106.63	133.85
Terrace Repair	Ha.	198	2.6	7.8788	315	5.97	17.56	200	3.49	13.6	353	7.68	18.045	1.01	34.23	12.063	28.64
Agro-Forestory	Ha.	100	0	0	70	2.22	6.529	10	0	0	756	0.59	1.3863	-90	0	480	-73.42
Silvipasture	Ha.	150	20	60.606	100	14.18	41.71	0	0	0	0	0	0	-100	-100	-100	-100
Mini Kits	No.	0	0	0	150	0.49	1.441	0	0	0	0	0	0	0	0	-100	-100
Mushroom Development	No.	0	0	0	0	0	0	20	0	0	1020	0.53	1.2453	2000	0	102000	53
Implements	No.	0	0	0	1	0.63	1.853	0	0	0	0	0	0	0	0	-100	-100
Chaff Cutter	No.	0	0	0	45	0.78	2.294	0	0	0	0	0	0	0	0	-100	-100
Hand Tokas	No.	0	0	0	110	0.05	0.147	0	0	0	0	0	0	0	0	-100	-100
Total	Ha.	788	33		810	34		1115	25.6		2763	42.56		41.5	-22.45	37.65	25.176

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

Note: R. F. C. Demonstration: Rain fed Crop Demonstration

O. F. F. Production: On Farm Fodder Production

Over the period, the sustained efforts by the project have improved the performance of agriculture. As per the crop cut experiments conducted in different sub-watersheds on standing crops during 2001-2002 in Kharif season, the yield of maize has increased 2.5 times. The yield of maize and wheat shown an increase from 22 quintals per hectare (maize) and 19 quintals per hectare (wheat) in the base period to 32 quintals per hectare and 27 quintal per hectare respectively, after the project intervention. In percentage terms, the increase in yield of maize and wheat respectively was recorded at 45 and 42 percent. The area covered under HYV crops has shown remarkable progress over the period. In 1999-2000, 4201 hectares of agricultural land has been covered under HYV crops. In subsequent years 2000-2001 and 2001-2002 (ending September 2001), 5779 hectares and 2338 hectares more arable land has been covered under

HYV crops. Over the period, more than 12,000 small and marginal farmers have been benefited from arable land treatment [IWDP, Hills-II (2001)].

Other important sector treated under arable land component is the horticulture. The rain fed (R. F.) demonstration has been carried out over 278 hectares of arable land in Ramnagar sub-watershed, whereas, 197 hectares of arable land has been exposed to R. F. demonstration for horticulture in sub-watershed of Akhnoor in the year 1999-2000. In the year 2001-2002 too, greater attention has been paid on R. F. horticultural demonstration. The table 3.2 makes it evident that comparatively more attention has been given in Akhnoor sub-watershed on R. F. demonstration than Ramnagar. It has been observed during the field visits that the sub-watershed of Ramnagar, being predominantly forested has already better horticultural plantations. The horticultural potential in Akhnoor is also tremendous, which has picked up after the project interventions. The horticultural rejuvenation activities have been carried out in both the selected sub-watersheds. About 300 hectares and 244 hectares of arable land respectively have been covered under horticultural rejuvenation in Ramanagar and Akhnoor in 1999-2000. In the next year, a significant increase has taken place in hectare coverage under horticulture rejuvenation in both the sub-watersheds, which stood at 440 hectares in Ramnagar and 814 hectares in Akhnoor. In terms of percentage change, the figures stood at 46.67 in Ramnagar and 233.6 in Akhnoor. Thus, it is clear that R. F. demonstration and horticulture rejuvenation has received more attention in sub-watershed of Akhnoor than Ramnagar.

The system of nursery development has also been implemented in both the sub-watersheds and location specific fruit plants were raised in these nurseries and supplied to the needy farmers on cost-sharing basis. In both the sub-watersheds, a few horticultural nurseries have been created and maintained by the project with active participation of local villagers. During the field visit, it has been observed that horticultural nurseries have been managed more effectively in the sub-watershed of Ramnagar than Akhnoor. The fruit plants of improved varieties such as mango, orange, guava, walnut, lemon, etc. conducive to local climatic conditions of the sub-watershed have been provided to the beneficiaries. The

plants of wild pomegranate, ber, mango, etc. have been found well distributed all over the selected sub-watersheds. The rejuvenation of wild pomegranate, ber, mango etc. has taken place after conducting grafting and budding with improved variety. It has been noticed that despite severe drought over the period, the survival percentage has been very encouraging, ranging between 40-85, the lowest for papaya and highest for pomegranate.

Table 3.2: Achievements of Watershed Development and Protection (Arable Land: Horticulture) in Sample Sub-Watersheds (Rs. in lacs)

		1999-2000						2001-2002						Ramnagar Change 1999-2000 to 2001-2002		Akhnoor Change 1999-2000 to 2001-2002	
		Ramnagar			Akhnoor			Ramnagar			Akhnoor						
Component	**Unit**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy. %**	**Fin.%**	**Phy. %**	**Fin.%**
Arable Land																	
Horticulture																	
R.F.Demonstration	Ha.	278	13.76	69.215	197	17	45.31	455	24.4	70.888	540	30.01	58.912	63.67	15.3	174.1	76.63
Hoticuture rejuvenations	Ha.	300	2.7	0.1988	244	1.51	0.375	440	3.92	11.412	814	5	9.8155	46.67	45.19	233.6	231.13
Tools	No.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nursery Development	Ha.	0	4.5	22.636	0	19	50.67	0	6.08	17.7	0	15.93	31.272	0	35.11	0	-16.16
Total	Ha.	578	19.88		441	37.5		895	34.4		1354	50.94		54.84	72.79	72.79	35.84

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

Non-Arable Land Treatment

In the selected sub-watersheds, the non-arable lands include public lands, forestlands, community lands and private lands. The non-arable lands have been treated under various components depending upon suitability or topography of the areas. The main component is afforestation in contour trenches besides other treatments. The tables 3.3 to 3.5 gives the data on the performance of non-arable land treatment under the project in selected sub-watershed for the years1999-2000 and 2001-2002. Under the non-arable land treatment, afforestation activities have been carried out on 90 hectares of village common lands (VCLs) in the sub-watershed of Ramnagar, whereas, 347 hectares of VCLs have been covered in Akhnoor in 1999-2000. In the next year, the hectare coverage of VCLs increased significantly in Ramnagar and stood at 200 hectares. Similarly, 338 hectares of VCLs have been enclosed in the sub-watershed of Akhnoor. Thus, it is evident that degraded VCLs have received more attention in agriculturally dominated watershed than the forested

watershed. However, in proportional sense, marginal decline has been recorded in hectare coverage between 1999-2000 and 2001-2002 in Akhnoor. It is to be noted that all the VCLs closures have been created with active participation of the people inhibiting the sub-watershed.

Table 3.3: Achievements of Watershed Development and Protection (Village Common Land) in Sample Sub-Watersheds (Rs. in lacs)

		1999-2000						2001-2002						Ramnagar Change		Akhnoor Change	
		Ramnagar			Akhnoor			Ramnagar			Akhnoor			1999-2000 to 2001-2002		1999-2000 to 2001-2002	
Component	Unit	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy. %	Fin.%	Phy. %	Fin.%
Village Common Land																	
Afforestation	Ha.	90	12.6	30.732	347	45.53	65.986	200	27.71	100	338	42.03	100	122.22	119.9	-2.594	-7.69
Silvipasture	Ha.	175	20.5	50	95	13.3	19.275	0	0	0	0	0	0	-100	-100	-100	-100
Veg. Shrub Barriers	Ha.	103	7.9	19.268	213	10.17	14.739	0	0	0	50	0	0	-100	-100	-76.53	-100
Total	Ha.	368	41		655	69		200	27.71		388	42.03		-45.65	-32.4	-40.76	-39.1

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

The silvi-pasture activities have also been under taken initially in both the sub-watersheds and 175 hectares of non-arable VCLs have been treated in Ramnagar, whereas, 95 hectares of degraded VCLs have been treated in Akhnoor. Later, the silvi-pasture treatment on VCLs has been abandoned in both the sub-watersheds. Besides, vegetative shrub barriers have also been created in project area to maintain and improve the soil moisture on the degraded VCLs. Over the period, project interventions on VCLs have shown their impact and the degraded patches have been regenerated and helped improving the productivity of these lands. With the regeneration of VCLs, system of rotational grazing and equal usufruct sharing has been created with active community participation of the beneficiaries. The fodder scarcity has declined considerably and fodder demand is met from the protected VCLs. The idea of fodder bank is propagated to accumulate the surpluses for selling to the scarce households/villages.

In addition to afforestation, silvi-pasture and vegetative shrub barriers, pasture development and forest rejuvenation activities have also been carried out on non-arable forestlands in the selected sub-watersheds. The afforestation activities have been implemented on degraded forests in both the sub-watersheds. In 1999-2000, 340 hectares of degraded forests have been covered

for afforestation in Ramnagar, whereas, 246 hectares of degraded forests have been included under afforestation programme in Akhnoor. In 2001-2002, the area covered under afforestation activities has increased significantly, and stood at 573 hectares in Ramnagar and 618 hectares in Ahknoor. In proportional terms, the increase was recorded at 68.53 per cent and 151.2 per cent respectively in Ramnagar and Akhnoor. In the sub-watersheds of Ramnagar and Akhnoor, pasture development have also been implemented on 110 hectares and 145 hectares of degraded pastures respectively initially, however, later the interventions related to pasture development has been abandoned. To begin with, the forest rejuvenation activities have been implemented in Ramnagar and laterally it has been extended to Akhnoor also. In 2001-2002, 409 hectares (Ramnagar) and 570 hectares (Akhnoor) of degraded forests have been enclosed for rejuvenation for which local population was actively engaged. The vegetative shrub barriers have also been created in the degraded forestlands in the project area. For instance, to begin with 203 hectares (Ramnagar) and 345 hectares (Akhnoor) of degraded forestlands have been treated with vegetative shrub barriers. In the year 2001-2002, additional 165 hectares and 345 hectares of degraded forestlands have been treated with vegetative shrub barriers respectively in Ramnagar and Akhnoor. Besides above, the silvi-pasture activities have also been carried out in both the sub-watersheds initially, but laterally it has been abandoned (See table 3.4). Over the period, the interventions on non-arable VCLs and forests have resulted in increased availability of fodder, forage/grasses, fuel wood and small timber, which is reflected in increased milk production, wool production, meat production, soil moisture regime, bio-diversity and reduction in soil run-off and soil erosion. For instance, significant increase has been recorded in forage/green grass production in the project area from a yield level of 3.40 ton per hectare (base line yield) to 10.60 ton per hectare as per crop-cut experiment carried out by the field functionaries of the project. Overall, the increase in yield of forage/grasses production has been recorded at 211 percent in the project area after the IWDP (Hills-II) intervention [IWDP, Hills-II (2001)].

Table 3.4: Achievements of Watershed Development and Protection (Forests) in Sample Sub-Watersheds (Rs. in lacs)																		
		1999-2000						2001-2002						Ramnagar Change		Akhnoor Change	
		Ramnagar			Akhnoor			Ramnagar			Akhnoor			1999-2000 to 2001-2002		1999-2000 to 2001-2002	
Component	**Unit**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy.**	**Fin.**	**Fin. %**	**Phy. %**	**Fin.%**	**Phy. %**	**Fin.%**
Forests																	
Afforestation	Ha.	340	51	39.844	246	43.24	34.454	573	122.74	82.944	618	105	67.753	68.53	141	151.2	142.9
Pasture Development	Ha.	110	9.19	7.1797	145	20.3	16.175	0	0	0	0	0	0	-100	-100	-100	-100
Forest Rejuvenation	Ha.	241	13.18	10.297	0	0	0	409	21.08	14.245	570	33	21.288	69.71	59.9	57000	3300
Veg. Shrub Barriers	Ha.	203	15.1	11.797	345	33.73	26.876	165	4.16	2.8112	345	17	10.96	-18.72	-72.5	0	-49.63
Silvipasture	Ha.	333	39.53	30.883	175	28.23	22.494	0	0	0	0	0	0	-100	-100	-100	-100
Total	Ha.	1227	128		911	125.5		1147	147.98		1533	155		-6.52	15.6	68.28	23.52

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

The drainage line treatment interventions have also been implemented in both the sub-watersheds, which include crate-wire structures, landslide treatment, earthen bag check dam, and vegetative gully control and road drainage line. Besides, repair of traditional water points such as bowallies/tanks, ponds, and water harvesting structures have also been implemented to improve the water regime in the project area. More than 150 traditional water points (bowallies) have been repaired in water scarce-forested watershed of Ramnagar over the period. Similarly, 75 ponds and 60 ponds have been repaired respectively in Ramnagar and Akhnoor. A few water-harvesting structures have also been repaired in both the sub-watersheds (See table 3.5). There are significant variations across the selected sub-watersheds in terms of activities implemented for drainage line treatment. The comparatively more crate-wire structures have been created in Akhnoor, whereas, traditional water points have been repaired comparatively more in Ramnagar. Actually, the predominantly forested watersheds have more problem of water scarcity, especially drinking water, which have been attended on priority in Ramnagar by rejuvenating the traditional water points and switching to gravity based water supply for drinking purposes. In Akhnoor also, the problem of water scarcity is acute, but being predominantly agricultural watershed with plain topography, it is easier to meet drinking water demand from piped water supply.

The agricultural land along the nalahs (rainfed streams) is heavily subjected soil erosion particularly during rainy season, which have been treated with crate wire

structures on priority basis in Akhnoor sub-watershed. The road drainage line has also been attended in both the sun-watersheds. It is important to note that each of the interventions under drainage line treatment have been implemented in the selected sub-watersheds on the basis of need analysis carried out by the field functionaries of the project through participatory rural appraisals (PRAs) excercises. The drainage line interventions have significantly reduced the water run-off and soil erosion and rejuvenated the traditional water harvesting structures. For instance, in the year 2001 for the months of June, July, August and September, rainfall (in mm) has been recorded respectively at 228.1, 475.9, 285.1 and 201.7, whereas, the water run-off (in mm) has been recorded at 106.40, 223.8, 120.9 and 87.4. The percentage water run-off (4/3 x 100) was estimated at 46.65, 47.03, 42.41 and 43.33 percent respectively for the months of June, July, August and September 2001. On the whole, the soil loss, which was 23.70 tons per hectare per annum in the base line period, has declined to 9.65 tons per hectare per annum after project intervention in the Shivalik hills [IWDP, Hills-II (2001)].

Table 3.5: Achievements of Watershed Development and Protection (Drainage Line) in Sample Sub-Watersheds (Rs. in lacs)

														Ramnagar		Akhnoor	
		1999-2000						2001-2002						Change		Change	
		Ramnagar			Akhnoor			Ramnagar			Akhnoor			1999-2000 to 2001-2002		1999-2000 to 2001-2002	
Component	Unit	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy. %	Fin.%	Phy. %	Fin.%
Drainage Line																	
Cratewire Str.	Cum	9531	40.62	16.82	11583	30.66	27.722	3133	20.04	20.216	1680	57.82	39.15	-67.13	-50.66	-85.49	88.58
DRSM	Cum	128725	171.89	71.18	49244	59.67	53.951	40570	44.77	45.163	71617	68.19	46.17	-68.48	-73.95	45.43	14.27
Bowallies/tanks	No.	79	8	3.313	0	0	0	85	10.72	10.814	0	0.49	0.332	7.59	34	0	49
Village Ponds	No.	45	5	100	60	2	1.8083	30	10.54	10.633	0	11.96	8.098	-33.33	110.8	-100	498
Water Harvesting Str.	No.	3	10	4.141	4	10	9.0416	0	5	5.0439	0	0.23	0.156	-100	-50	-100	-97.7
Landslide Treatment	Rmt.	50805	5.49	2.273	73402	4.27	3.8608	131070	8.06	8.1307	69645	6.5	4.401	157.99	46.812	-5.11	52.22
Veg. Spurs	Rmt.	0	0	0	8540	0	0	0	0	0	49000	0	0	0	0	473.77	0
Earthen Bag Check Dam	Cum	0	0	0	0	0	0	0	0	0	2000	0	0	0	0	200000	0
Veg. Gully Control	Rmt.	4000	0.5	0.207	44760	2.52	2.2785	0	0		107700	2.5	1.693	-100	-100	140.62	-0.79
Road Drainage Line	Rmt.	10000	0	0	44760	1.48	1.3382	14020	0	0	106600	0	0	40.2	0	138.16	-100
Total		203188	241.5		232353	110.6		188793	99.13		408242	147.69		-7.085	-58.95	75.69	33.53

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

Livestock Institutional Support

The cattle population in the State of Jammu and Kashmir mainly consists of cows, buffaloes, sheep, goat, horses and camels. The camel and horses are few in numbers in the project area and are used for transport purposes. The cows and buffaloes are reared for dairy, whereas, sheep and goat are reared for meat and wool. The cattle population in the project area is 2.38 lacs, spread over an area of 1.11 lacs hectares, out of which the cows are 1.23 lacs, buffaloes 0.35 lacs, and sheep and goats are 0.80 lacs. The nomadic cattle population increases with their arrival during summer in Karewas and winter in Shivalik hills. The livestock predominantly consists of local breeds with low yield of milk and wool. PRA exercises were carried out by the field functionaries to ascertain the problems in livestock development in the project area, which identified the problems like (a) absence of effective health care system; (b) low availability of fodder; and (c) inadequate artificial insemination facility for breed improvement.

IWDP (Hills-II), Jammu and Kashmir has established 3 veterinary hospitals and 7 veterinary dispensaries in the project area. It is significant to note that all the veterinary hospitals have been established in the sub-watershed of Ramnagar. The veterinary facilities created across the project area are catering to the requirement of the cattle population. More specifically, attention have been given on (i) mass vaccination against foot-mouth diseases, haemoharrahic speticimia etc.; (ii) dosing against intestinal worms and liver fluke; (iii) artificial insemination; (iv) natural services by way of providing breeding cow bulls and rams; (v) castration of scrub bulls; (vi) dipping of sheep against ecto parasite; (vii) distribution of cross-bred ram bouliet/marino rams; (viii) health cover for different diseases; and (ix) feed for calf rearing, pregnant eves and lambs born.

Table 3.6: Achievements of Watershed Development and Protection (Livestock: Genetic Improvement) in Sample Sub-Watersheds (Rs. in lacs)

														Ramnagar		Akhnoor	
		1999-2000						2001-2002						Change		Change	
		Ramnagar			Akhnoor			Ramnagar			Akhnoor			1999-2000 to 2001-2002		1999-2000 to 2001-2002	
Component	Unit	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy. %	Fin. %	Phy. %	Fin.%
Livestock: Genetic Improvement																	
Cryocans	No.	0	0	0	0	0.42	3.09	0	0	0	0	0	0	0	0	0	-100
A.I Centre	Rs.	0	0.3	2.19	0	0.27	1.98	0	0.3	3.958	0	0.19	1.482	0	0	0	-29.63
Dairy Unit	No.	0	1	7.3	10	2.04	15	10	3.38	44.59	25	5	39	1000	238	150	145.1
Veternary Hospital	No.	1	6.45	47.1	0	2.37	17.4	0	2	26.39	0	1.93	15.05	0	-68.99	0	-18.57

Veternary Dispensary	No.	2	2.25	16.4	0	6.94	51	0	1.9	25.07	0	1.95	15.21	0	-15.55	0	-71.9
Equipments	Rs.	0	1.3	9.49	0	0.71	5.22	0	0	0	0	0	0	0	-100	0	-100
Poultry Unit	No.	0	0	0	0	0	0	0	0	0	0	2.49	19.42	0	0	0	249
Preg. Cows and Calves Feed	No.	0	0	0	0	0	0	0	0	0	0	1	7.8	0	0	0	100
Sterlity Control	Rs.	0	0.6	4.38	0	0.29	2.13	0	0	0	0	0	0	0	-100	0	-100
Castrators	No.	0	0.6	4.38	0	0.57	4.19	145	0	0	4	0.26	2.028	0	-100	400	-54.39
Feeding Stall	No.	0	0.61	4.45	0	0	0	0	0	0	0	0	0	0	-100	0	0
Bull/Buffalo	No.	0	0.3	2.19	0	0	0	0	0	0	0	0	0	0	-100	0	0
Maintenance of Livestock	Rs.	0	0.29	2.12	0	0	0	0	0	0	0	0	0	0	-100	0	0
Total		3	13.7		10	13.6		155	7.58		29	12.8		0	-44.67	190	-15.81

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

The data presented in table 3.6 makes it clear that under the component of genetic improvement of livestock, artificial insemination centres have been established in both the sub-watersheds, which have revolutionized the dairy farming elsewhere. However, the impact of artificial insemination programme is reportedly modest in project area, which needs to be propagated by the field functionaries. In order to improve the livestock health and productivity, veterinary hospitals and dispensary have been started with project interventions. The dairy and poultry units have also been given assistance, however, very marginally. The problem of poverty, unemployment and underemployment is very acute in the project area and dairy and poultry rearing could be alternative viable income generating activities (IGAs) for the people inhibiting the sub-watersheds, if undertaken on group basis. The products of these micro-enterprises have ready market in the local villages and nearby townships. It is ironical to note that livestock development infrastructure has been created, but the maintenance of the infrastructure has not been given adequate attention. As already noted, a significant proportion of the population in the project area is rearing of sheep and goat as a source of livelihood. The transhumance pastoral and semi-pastoral communities depend heavily on sheep and goat rearing, for which provision has been made for migratory health-cover facilities (See table 3.7). New modified techniques have also been propagated under sheep husbandry to improve the quality of sheep and goats reared by the transhumance pastoral and semi-pastoral communities in the selected sub-watersheds. However, the sheep

husbandry has not been promoted in a desired way, keeping in view the problems being faced by transhumance and local residents.

Besides above, the project has also been providing facilities in the villages, where veterinary hospital or dispensary is not available. The veterinary camps have also been organized in each village of the selected sub-watersheds. On the whole, 2251 artificial insemination has been done, 178 veterinary camps has been organized and 104, 877 and 182 of dairy, poultry and sheep units were set up across the project area over the period ending September, 2001. The concerted efforts of the project have resulted in a significant increase in the yield of milk and wool. For instance, the yield of cow milk has increased from 2.75 litre per day to 4.25 litre per day in case of local cow and from 6.75 litre per day to 8.60 litre per day in case of crossbred cow after project intervention. Similarly, over the project period, the yield of buffalo milk has increased from 3.50 litre per day to 5.25 litre per day in case of local buffalo and from 8.60 litre per day to 10.30 litre in case of cross-bred buffaloes. Likewise, the yield of sheep wool has increased significantly from a base line yield of 2.25 Kg. per annum to 3.40 Kg. per annum [IWDP, Hills-II (2001)].

Table 3.7: Achievements of Watershed Development and Protection (Livestock: Genetic Improvement) in Sample Sub-Watersheds (Rs. in lacs)

		1999-2000						2001-2002						Ramnagar Change 1999-2000 to 2001-2002		Akhnoor Change 1999-2000 to 2001-2002	
		Ramnagar			Akhnoor			Ramnagar			Akhnoor						
Component	Unit	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy.	Fin.	Fin. %	Phy. %	Fin.%	Phy.%	Fin.%
Sheep Husbandary																	
Rams	No.	0	1	20.6	0	0	0	359	0.14	3.867	0	0	0	359	-714.1	0	0
Sheep Units	No.	0	0	0	0	0	0	0	0	0	0	2	28.78	0	0	0	2
Health Cover (Migratory)	Ls.	0	2.55	52.6	0	0.74	25.2	15	2.5	69.06	0	1.99	28.63	15	-99.5	0	-35.2
Rams Feed	No.	0	0.5	10.3	0	0.4	13.6	0	0	0	0	0	0	0	-100	0	-100
Preganant Eves Feed	No.	0	0	0	0	0	0	0	0.98	27.07	0	1.5	21.58	0	0.98	0	1.5
DV/T																	
Dipping Vats/Tubs	No.	0	0.8	16.5	0	1.8	61.2	5360	0	0	4.4	1	14.39	5360	-100	4.4	-179
Dipping Troughs	No.	0	0	0	0	0	0	0	0	0	0	0.46	6.619	0	0	0	0.46
Total		0	4.85		0	2.94		5734	3.62		4.4	6.95		5734	-130.4	4.4	-35.35

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

In brief, watershed areas of the State of Jammu and Kashmir is facing multiple problems like poverty, backwardness, rapid environmental degradation, stagnant agriculture, lack of infrastructure and employment opportunities. Because of persisting poverty, unemployment and underemployment, the poor inhibiting the watersheds have over-utilized the resources causing severe damage to VCLs,

forestlands, etc., which have resulted in rapid fall in productive potential of Shivaliks and further decline in livelihood base of the rural poor, requiring immediate attention. After the project intervention, an integrated approach has been adopted to mitigate the problem of environmental degradation and poverty alleviation, through evolving participatory approaches. The various project interventions, as discussed above, have improved significantly the environmental resources of the project area in the shape of: (i) significant improvement in vegetal cover and bio-mass thereof; (ii) multifold increase in the production of local as well as HYV of grasses; (iii) decrease in biotic pressure on the natural forests; (iv) revised the trend of deforestation; (v) slowing down of water run-off and increase in water regime of the catchments; and (vi) increase in yield of different crops, milk, wool and meat. It is significant to note that soil loss has decreased from 23.70 tons to 9.65 tons and on average grass bio-mass has recorded a growth of 6 quintals per hectares. Besides, the selected sub-watersheds have shown considerable improvement in bio-diversity and better aesthetic look. The treated areas under afforestation, rejuvenation and silvi-pastures interventions have also produced more bio-mass in the shape of large scale production of grasses and bushes.

Environmental Impact

Common property resources have been a major source of livelihood for the poor farmers in ecologically fragile areas. The degradation of CPRs has put the livelihood of the poor farmers at risk. Watershed development projects have a strong livelihood improvement dimension and aims at improving the welfare of the rural community through rehabilitation of degraded CPRs and conservation. In the project area, agriculture is the main source of livelihood of poor farmers, which is characterized by low and uncertain yields. The agriculture is unable to fully meet livelihood security. Keeping this in view, supplementary source of livelihood diversification strategies have assumed importance. In the context of IWDP (Hills-II), the project staff has provided training to the poor farmers in better cropping techniques, which have resulted in improved crop yields. The project

has demonstrated the farmers regarding improved agricultural practices such as vegetative bunding, proper crop rotation, on-farm fodder production, restriction on growing water intensive crop, use of vegetative fencing, etc. The project has also propagated agro-forestry and rainfed horticultural demonstration. All these project interventions have resulted in motivating the individual farmers in switching to improved on-farm and off-farm activities, which has contributed significantly towards improving the soil moisture conservation, improved ground water regimes, increased availability of fuelwood and fodder on private lands, decline in soil erosion and reduced pressure on CPRs. The project interventions have facilitated the farmers in improving the productivity and thereby their livelihood conditions. The project has also promoted livestock development by introducing artificial insemination techniques, which has resulted in hybridization of livestock with improved yield and consequent reduction in number of animals. This has significant reduced the grazing pressure on watershed. The system of stall-feeding has also been propagated, as most of the CPRs are enclosed for rehabilitation and regeneration. The project has also popularized the use of improved cooking stoves and LPG gas by demonstrating the benefits to the farming households. With more use of these alternative sources of energy, the pressure for on CPRs has been reduced significantly. Besides above, some of the project interventions such as rehabilitation of gravity based irrigation system, water harvesting structures, enclosures on common property resources and village common lands, soil and water conservation measures required collective action through group formation, as the benefits from such interventions cannot be reaped singly but collectively, for which user groups have formulated suitable resource use rules to ensure equity in watershed development.

Reduction in Rainwater Loss and Sediment Yield

Under IWDP (Hills-II), Jammu and Kashmir, soil and water conservation measures have been promoted using evolving participatory approach. The micro-level watershed planning was carried out using the sweeping transect and emphasis has been given on soil erosion control on hill slopes and gullies,

regulation of water flow system in the watershed drainage, and rearrangement of farmlands. In the entire cultivated area, wastelands and area other than hills and hillocks which generally come under grazing lands, were fully treated with appropriate soil and water conservation measures like contour bunding, field bunding, gully plugging, field to field drainage outlet structures, etc. In addition to this, the diversion channels were also made along all the hills and hillocks to guide the high velocity runoff from these sites on a safe and controlled way, so that the runoff with soil loads should not enter the arable land and cause further degradation. For the stabilization of bunds and gully plugs, the entire bund area was sown with pastures grass and legume. Similarly, in the hills and hillocks several of the soil conservation measures were adopted. The adverse climatic factors of the Shivaliks necessitated the adoption of micro catchment techniques for run-off harvesting and conservation practices as done in similar areas elsewhere. The usefulness and scope of rain water harvesting and conservation practices in improving tree growth in arid zones have been amply demonstrated. The staggered trenches ensured higher survival rate of out planted seedlings in the experimental plots. The contour trenches also helped in moisture retention but the most of the sub-watershed of Akhnoor being an undulated terrain without sufficient slopes – the contour interval had to be very wide. The soil and moisture conservation measures in the demonstration plots were much effective as evidenced by the enhanced survival rate of out planted seedlings. The effect of regeneration of vegetation, along with soil and water conservation measures on hillslopes and wastelands was substantial. In Shivaliks, the run-off soil loss on barren hills was 23. 70 tons in the baseline period, which fell to 9.65 tons per hectare after treatment. In Karewas, it declined to 4.80 tons per hectare from 8.24 tons per hectare in baseline period. The progressive reduction in soil loss and sediment yield as a result of quick recovery of vegetation on hillslopes and lands adjoining the foothills has resulted in a greatly improving surface and ground water regime of the selected sub-watersheds.

Table: 3.8 Run-off Soil Measures (April 2001 to Sept. 2001)			
Month	Rainfall (in mm)	Run-off (in mm)	Run-off%4/3 .100)

Shivaliks			
1-Apr	85.6	-	-
1-May	57.4	-	-
1-Jun	228.1	106.4	46.65
1-Jul	475.9	223.8	47.03
1-Aug	285.1	120.9	42.41
1-Sept	201.7	87.4	43.33
Soil loss (Tons per Ha/ per Year): Baseline: 23.70, Current: 9.65 Tons/Ha.			
Karewas			
1-Apr	107.1	20.33	18.98
1-May	35.5	4.05	11.41
1-Jun	26	5.2	20
1-Jul	48.1	16.53	34.37
1-Aug	37.1	9.45	25.47
1-Sept	20.5	2.7	13.17
Soil loss (Tons per Ha./ Per Year): Baseline: 8.24, Current: 4.8 Ton/Ha.			

Source: Status Report for Supervision Mission of World Bank, IWDP (Hills-II), Jammu and Kashmir, 2001

Status of Water Resources and Irrigation

The table 3.9 gives the data on surface and ground water resources across the sampled sub-watersheds. Both the average number of water points (bowlies) as well as the gravity based water points per village were comparatively more in project area with VDC than without VDC and non-project area. In the project area with VDC, there were 6.8 and 5 natural water points and gravity based water points respectively in forested watershed and 4.3 and 2 respectively in agricultural watershed. In non-project area, the average number of natural and gravity based water points were comparatively very low and stood respectively at 1.6 and 1 in forested watershed, and 2.6 natural water points in agricultural watershed, whereas there was no gravity based water points in agricultural watershed. This clearly reflects the benefits of participatory natural resource management through which the project has implemented the repairs of water resources points and installed new water points, mainly gravity based water resources. In the forested watershed, the difference between project area with VDC and non-project area in average number of natural water points and gravity based water points was as high as 3.2 and 4 respectively. The average number

of hand pumps per village was also reportedly high in project area with VDC than project area without VDC and non-project area.

Table 3.9: Status of Water Resources and Irrigation (per village)

Item	Unit	Project area with VDC		Project area without VDC		Non-project area	
		Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS
Surface Water Supply							
Natural Water Points (Bowlies)	No.	6.8	4.3	5.2	3.4	3.6	2.6
Gravity based Water Points	"	5	2	2	1	1	0
Ground Water Supply							
Hand Pumps	"	2	3	0	1	0	1
Water Harvesting Structures	"	3.5	2.9	2	1.8	1.2	0.7
Irrigation							
Irrigation Channel	No.	2.8	1.7	1.8	1.2	1	0.8
Gross Irrrigated Land	Ha.	98	67	48	64	69	44
Net Irrigated Land	Ha.	68	36	34	37	27	18
Irrigation Intensity	%	144.11	186.11	141.17	172.97	255.56	244.44
Note: Irrigation Intensity =Gross Irrigated Area / Net irrigated Area x 100							

A mere perusal of the table 3.9 makes it clear that the number of water harvesting structures were more in project area with VDC than project area without VDC and non-project area. Similar is the case with the length of irrigation channel. However, significant differentials were noticed across project area with VDC and without VDC as well as non-project area (see table 3.10). The number of water harvesting structures as well as length of irrigation channel was significantly higher in project area than non-project area. In the project area with VDC, the average number of water harvesting structures per village was 3.5 and 2.9 respectively in forested and agricultural watersheds, whereas, it was 2 and 1.8 respectively in project area without VDC. In non-project area, the average number of water harvesting structures was 1.2 and 0.7 respectively in forested and agricultural watersheds. It is significant to note that the quality of water harvesting structures were also reportedly better in project area with VDC than non-project area, due to participatory repairs and renovation activities as well as maintenance initiated by the project. Similarly, the average length of irrigation channel in the project area with VDC was 2.8 km and 1.7 km per village respectively in forested and agricultural watershed, whereas, it was 1.8 km and

1.0 km respectively in project area without VDC. In the non-project area, the average length of irrigation channel was comparatively low and it was just 1.0 km and 0.8 km per village respectively in forested and agricultural watersheds. As a result of increased water potential in the selected sub-watersheds, the area under irrigated cropping increased significantly.

Table 3.10: Difference in Status of Water Resources and Irrigation in Sample Area (per village)

Item	Unit	Project area with VDC - Project area without VDC		Project area with VDC - Non-project area		Project area without VDC - Non-project area	
		Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS
Surface Water Supply							
Natural Water Points (Bowlies)	No.	1.6	0.9	3.2	1.7	1.6	0.8
Gravity based Water Points	"	3	1	4	2	1	1
Ground Water Supply							
Hand Pumps	No.	2	2	2	2	0	0
Water Harvesting Structures	"	1.5	1.1	2.3	2.2	0.8	1.1
Irrigation							
Irrigation Channel	No.	1	0.5	1.8	0.9	0.8	0.4
Gross Irrrigated Land	Ha.	50	3	29	23	-21	-20
Net Irrigated Land	Ha.	34	-1	41	36	7	19
Irrigation Intensity	%	2.94	13.14	-111.45	-58.33	-114.39	-71.47

Since changes in irrigated area depend on numerous factors, many of which could not be measured in the current study, the findings here must be treated cautiously. The data presented in table 3.9 reveals that the changes in gross and net irrigated area in project area with VDC and without VDC, and non-project area. A perusal of the table makes it clear that irrigation intensity in forested and agricultural sub-watersheds in project area with VDC was 144.11 per cent and 186.11 per cent respectively. In project area without VDC, it was 141.17 per cent and 172.97 per cent, whereas in non-project area, it was 255.66 per cent and 244.44 per cent respectively in forested and agricultural sub-watersheds. The data shows the marked differences in irrigation intensity across the sample area. The difference in irrigation intensity was 2.94 per cent and 13.14 per cent respectively in forested and agricultural sub-watersheds of project area with VDC and without VDC. It is significant to note that the differences in irrigation intensity in project area with VDC and non-project area (see table 3.10).

Change in Crop Intensity and Crop Productivity

As a result of the improved soil moisture regime, the increase in supplementally irrigation resources and increased use of fertilizer (including cow-dung), the cropping intensity has improved in the project area compared to non-project area. The data on grossed crop area, net area sown and crop intensity is presented in table 3.11, which clearly reveals significant variations across the selected sub-watersheds. There are considerable differences in cropping intensity in project area with VDC and non-project area, which can be attributed to the project interventions in the field of agriculture through rainfed crop demonstration, propagation of the use of modern inputs through extension agents of the project. It is to be noted that differences in cropping intensity was reportedly negative across the project area with VDC and without VDC as well as non-project area. For instance, it was – 58.26 per cent and – 46.27 per cent respectively between project area with VDC and non-project area.

It is very difficult to isolate the impact of various inputs used on crop yields. Due to creation of VCLs and forest closures, an increase in the vegetation has taken place. The over all soil-moisture regimes have also improved after project intervention. The project has repaired the traditional irrigation water distribution channels (khuls), consequently the irrigation water availability and flow has improved. Keeping the influence of these factors aside, the data presented in table 3.12 shows differential levels of yields of various crops such as maize, paddy, pulses and wheat across the selected sub-watersheds, largely due to increased use of non-seed inputs. A cursory glance at table 3.12makes it evident that average crop yield per hectare has been comparatively more in project area with VDC than project area without VDC, and further the yield per hectare has been comparatively higher in project area without VDC than non-project area. The productivity of selected crops is comparatively higher in agricultural sub-watersheds than forested sub-watersheds. However, a significant variation in crop yield is reported across the project and non-project area.

Table 3.12: Difference in Crop Intensity and Crop Yields in Sample Area							
		Project area with VDC - Project area without VDC		Project area with VDC - Non-project area		Project area without VDC - Non-project area	
Item	Unit	Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS
Gross Cropped Area	Ha.	90	-33	50	6	-40	39
Net Sown Area	Ha.	101	-25	88	26	-20	51
Crop Intensity	%	-24.91	-30.95	-58.26	-46.27	-33.35	-15.32
Non-seed Inputs and Crop Yields							
Maize	Qntl./Ha	1.4	1.4	2.1	2.2	0.7	0.8
Paddy	"	0.7	1.6	0.8	1.7	0.1	0.1
Pulses	"	0.34	0.4	0.64	0.5	0.3	0.1
Wheat	"	0.76	1.5	1.36	2.1	0.6	0.6
Seed Inputs and Crop Yields							
Maize							
Local	Qntl./Ha	0.7	0.5	3	3	2.3	2.5
Hybrid	"	0.7	1.7	3.9	3.9	3.2	2.2
Difference	"	0	1.2	0.9	0.9	0.9	-0.3
Paddy							
Local	"	1.4	0.9	1.8	2	0.4	1.1
Hybrid	"	0.9	1.4	2.2	2.4	1.3	1
Difference	"	0.5	0.5	0.4	0.4	0.9	-0.1
Wheat							
Local	"	1.5	2.3	2.3	3	0.8	0.7
Hybrid	"	0.9	0.7	4	3.9	3.1	3.2
Difference	"	-0.6	1.6	1.7	0.9	2.3	2.5

The yield difference in the project area with VDC and without VDC was low compared with project area with VDC and non-project area in forested as well as agricultural sub-watersheds. The yield difference between project area with VDC and non-project area was 2.1 quintals, 0.8 quintal, 0.64 quintal and 1.36 quintal per hectare respectively for maize, paddy, pulses, and wheat in forested watershed. Whereas, in agricultural watershed, yield differences between project area with VDC and non-project area was markedly high and stood at 2.2 quintals, 1.7 quintals, 0.5 quintal, and 2.1 quintals respectively for maize, paddy, pulses, and wheat. However, such differentials were not so marked in project area without VDC and non-project area. The yield differences were 0.8 quintal, 0.1 quintal, 0.1 quintal and 0.6 quintal respectively for maize, paddy, pulses and wheat in agricultural watershed, and more or less the same is true for forested watershed (see table 3.12).

The data presented in table 3.12 further substantiate the yield differentials across the selected sub-watersheds. As can be noticed elsewhere too, there are significant differences in yield of local and hybrid varieties of crops in forested as well as agricultural sub-watersheds. For instance, yield difference in local and hybrid maize is 2.3 quintal per hectare in forested sub-watershed in project area with VDC and without VDC. Thus, one can infer that new institutional arrangements have no impact on the yield of local and hybrid variety. The yield difference is 1.2 quintal per hectare in agricultural sub-watershed in project area with VDC and without VDC. A significant differential in yield is noticed between project area with VDC and non-project area, as well as project area without VDC and non-project area. More or less the same applied to other crops with minor differences across the forested and agricultural sub-watersheds. On the whole, the average crop yield per hectare has significantly improved after the project area.

Afforestation, Horticulture Plantations and Fodder Production

Major efforts were made for revegetation of VCLs and grazing lands under hill and hillocks. Before project, these sites were totally devoid of vegetation and barren and cannot support and provide grazing resources to the animals of the villages of the watershed. The availability of the firewood was also negligible from these sites. The fast growing plant species like pasture grasses, legumes, shrubs and trees were planted. It is not easy to work and vegetate these highly degraded sites even without skeletal soils and also arrest runoff from rains in such steep slopes. Several of the soil conservation measures coupled with vegetational support helped in checking runoff soil loss and vegetate these sites. The trees and shrubs were planted in the pits putting earth and pebbles on the lower slopes so that these pits can hold rainwater. Small staggered trenches were also made for in-situ moisture conservation.

Table 3.13: Afforestation, Horticulture Plantations and Fodder Production

Item	Unit	Project area with VDC		Project area without VDC		Non-project area	
		Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS

Afforestation							
Community Land	No./per Ha.	84	73	64	58	42	24
Forest Land	"	68	57	54	47	38	19
Horticulture							
Plantation	"	338	217	224	177	83	52
Demonstration	"	87	78	72	68	52	38
Rejuvenation	"	76	68	63	51	43	28
Fodder Production							
Green	Qntl./per Ha.	410	360	385	330	318	115
Dry	"	48.4	37.6	29.3	24.7	22.4	14.2

The afforestation plantations on community land and forestland was comparatively high in project area with VDC than project area without VDC and non-project area. It is clear from table 3.13 that more afforestation activities have been implemented significantly in forested watershed than agricultural watershed across the selected sub-watersheds. For instance, afforestation plantations on community land were 84 and 73 per hectare in forested and agricultural watersheds in project area with VDC. It was 68 and 17 per hectare respectively in forested and agricultural watershed in project area without VDC. Similarly, in non-project area, afforestation plantations on community land in forested and agricultural watersheds was 42 and 24 per hectare respectively, whereas on forestland, it was 38 in forested watershed and none in agricultural watershed.

In the project area with VDC, horticultural plantations were reportedly higher than project area without VDC and non-project area. A perusal of the data presented in table 3.13 makes it clear that horticultural plantations per hectare were higher in forested sub-watershed than agricultural watershed. The table 3.13 also makes it evident that horticultural plantations were 338 and 227 per hectare in forested and agricultural watersheds respectively in project area with VDC, whereas in project area without VDC, it was 224 and 177 per hectare. In non-project area, horticultural plantations were 83 and 52 per hectare respectively in forested and agricultural watersheds, which were significantly lower than project area. Not only this, the survival rate of horticultural demonstration and rejuvenation were comparatively higher in forested watershed than agricultural watershed. For instance, survival rate of horticultural demonstration and rejuvenation was 87 per cent and 76 per cent respectively in forested watershed

in project area with VDC and 52 per cent and 45 per cent respectively in non-project area (see table 3.14).

Table 3.14: Difference in Afforestation, Horticulture Plantations and Fodder Production in Sample Area

Item	Unit	Project area with VDC - Project area without VDC		Project area with VDC - Non-project area		Project area without VDC - Non-project area	
		Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS
Afforestation							
Community Land	No./per Ha.	20	15	49	49	22	34
Forest Land	"	14	10	38	38	16	28
Horticulture							
Plantation	"	114	40	255	165	141	65
Demonstration	"	15	10	35	40	20	30
Rejuvenation	"	13	17	33	40	20	23
Fodder Production							
Green	Qntl./per Ha.	25	30	95	245	67	215
Dry	"	19.1	12.9	2.6	23.4	6.9	10.5

The average yield of fodder production across the selected sub-watersheds is shown in table 3.13. In this case also, significant differences can be noticed across project area with VDC and without VDC and non-project area. The project area with VDC has shown a remarkable performance in terms of both the green and dry fodder productions. The net difference in green fodder yield in project area with VDC and without VDC was 25 kg and 30 kg respectively in forested and agricultural sub-watersheds, and the net difference in yield of dry fodder was 19.1 kg and 12.9 kg respectively in forested and agricultural sub-watersheds. When we see the net differences in fodder yield in project area with VDC and non-project area, very remarkable differences can be noticed. The net difference in yield of green fodder was as high as 95 kg in forested watershed and 245 kg in agricultural watershed, whereas, the net difference in yield of dry fodder was 26 kg and 23.4 kg respectively (see table 3.14).

Livestock Development

IWDP (Hills-II), Jammu and Kashmir have made significant attempt to organize and develop animal husbandry in the project area and the facilities were provided for artificial insemination. The programme has made a modest dent on crossbreeding. The semen bank and deep-freezing of bovine semen as a part of this project was an important landmark in the field of cattle breeding in rainfed area of Jammu and Kashmir. However, artificial insemination and frozen semen technology has been restricted to few villages, the cattle sheds for good quality bulls have not been properly managed and they are underfed. On the whole, the breed improvement programme has been only moderately successful. There has been significant increase in milk yield, which may be attributed to higher productivity of crossbred animals. The yield rates of local milch animals remained stagnant, whereas, the yield rates of crossbred animals continued to increase at a rapid rate initially. The initiation of protection of VCLs and forestlands by creating enclosures and the poor usufruct sharing arrangements there from has resulted in marginal decline in the yield of even crossbred animals lately.

The growing economic opportunities for undertaking dairy farming as a commercial proposition combined with the interaction among the number of factors in agrarian rainfed economy, households have been progressively reducing their holding of drought animals and increasing their stock of milch animals. It has been observed that the requirement of work animals in the project area has been declining rapidly. The factors underlying this process are decline in the average size of cultivated holding, shift in cropping pattern, increase in the cost of rearing work animals, less availability of VCLs, common grazing lands, protection and closures of VCLs and forests. On the whole, the decline in the requirement of work animals and increase in the requirement of milch animals has resulted in significant changes in the composition of cattle population. While the adult male cattle population showed a sharply falling trend, the adult female cattle population has shown an increasing trend. Consequently, sex ratio of adult cattle has shifted in favour of females; the population of buffaloes has shown a declining trend. At the same time the rise in the profitability of milk production has resulted in an intensive selection process in the rearing and maintenance of cows

for milk. Thus, while attempts are being made to rear the best young female to adulthood, the unproductive and low productive animals are eliminated from the herd by disposing them off in the market.

Table 3.15: Livestock and Yield (per household)

Item	Unit	Project area with VDC		Project area without VDC		Non-project area	
		Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS
Milch Animals	No.	2.8	3	3.2	3.6	4.2	4
Milch Yield							
Cow	Litre/per Animal	4.25	4	3.75	3.5	3.25	2.5
Buffalo	"	6.5	5.25	4.5	4	4	3.5
Sheep	No.	4.8	3.6	3.2	2.8	2	1.2
Wool Yield	Kg./per Sheep	3.1	2.4	1.5	1.3	1	0.8

The average number of milch animals per household and milk yield is given in table 3.15. The data presented in table makes it evident that average number of milch animals was reportedly more in forested watershed than in agricultural watershed across the sample area. In the non-project area, the average number of milch animals were reportedly higher than project area with VDC and without VDC, which clearly reflects that households in project area were rearing lesser number of milch animals than households in project area without VDC and non-project area. The differences in average number of milch animals in project area with VDC and without VDC were quite small than project area with VDC and non-project area. For instance, in the forested watershed, the difference in average number of milch animals in project area with VDC and without VDC was – 0.4, whereas in agricultural watershed, the difference in project area without VDC and non-project area was – 4. The table also reveals that average milk yield per animal across sample area. A mere perusal of the data given in table 4.18 makes it evident that milk yield was comparatively high in project area with VDC than project area without VDC and non-project area (see table 3.16).

Table 3.16: Difference in Livestock and Yield in Sample Area (per household)

Item	Unit	Project area with VDC - Project area without VDC		Project area with VDC - Non-project area		Project area without VDC - Non-project area	
		Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS
Milch Animals	No.	-0.4	-0.6	-1.4	-1	-1	-4

Milch Yield							
Cow	Litre/per Animal	0.5	0.5	1	1.5	0.5	1
Buffalo	"	2	1.25	2.5	1.75	0.5	0.5
Sheep	No.	1.6	0.8	6.8	2.4	1.2	1.6
Wool Yield	Kg./per Sheep	1.6	1.1	2.1	1.6	0.5	0.5

The average number of sheep per household was comparatively high in forested watershed across the sample area. It is significant to note that average number of sheep were more in project area with VDC than project area without VDC and non-project area. Similarly, wool yield was as high as 3.1 kg per sheep in forested watershed and 2.4 kg per sheep in agricultural watershed in project area with VDC. In project area without VDC, it was reportedly 1.5 kg and 1.3 kg respectively in forested and agricultural watershed, whereas, in non-project area, it was comparatively low and stood at 1 kg and 0.8 kg respectively (see table 3.16).

Table 3.17: Livestock Production Objectives by Sample Population

Production Objectives	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Milk	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
Self	147	67.74	69	72.63	34	56.66	84	70.59	103	88.79	91	92.8
Both (M & S)	70	32.25	26	27.37	26	43.33	35	29.41	13	11.20	7	7.14
Total	217		95		60		119		116		98	
Milk-Based Product												
Self	187	86.17	75	78.95	50	83.33	95	79.83	85	73.27	80	81.63
Both (M & S)	30	13.82	20	21.05	10	16.66	24	20.17	31	26.72	18	18.36
Total	217		95		60		119		116		98	
Agriculture												
Self	230	100	84	100	53	100	119	100	116	100	92	100
Both (M & S)	0	0	0	0	0	0	0	0	0	0	0	0
Total	230		84		53		119		116		92	

Note: M & S: Market and Self

The indigenous livestock breeds of the forested watersheds in Shivaliks have been exposed to natural selection for a very long time and are thus well adapted to harsh environmental conditions. IWDP (Hills-II) focus on new breeds under insemination programme at subsidized price. These changes weakened indigenous breeding system that could improve livestock hardiness. The crossbred livestock of better quality is replacing the local cattle, sheep and goat. Thus, after project intervention indigenous livestock diversity has declined

precariously more in the forested sub-watershed of Ramnagar than Akhnoor and the decline is reportedly more in those of the villages where the VDCs are taking all types of decisions related to watershed development and protection. It is, thus, urgently needed to speed up the development of sustainable and long-term crossbreeding programmes.

The sampled population reared the milch animals to supplement household nutrition and earnings through the sale of milk and milk products in the village nearby townships. In the project area with VDC, a higher proportion of the milk is consumed within household and more than one-third and one-fourth of the milk is sold respectively in forested and agricultural sub-watersheds. The milk-based products such as cheese, ghee, kalari, etc. are sold in the market, but often at very low price due to undeveloped rural markets. The data given in table 3.17 also revels that sampled population in non-project area sell a small proportion of the milk and milk-based products in market, due to low milk yields of the local milch animals kept by them. It has been reported that the project has distributed improved grass varieties for plantation in fields and field bunds, which have resulted in improved fodder availability. The creation of user groups have facilitated in usufruct sharing on more or less equitable basis and ensured better availability of fodder. The non-project area is reportedly scarce in fodder and VCLs and forestlands are severely degraded, however, with project intervention regeneration of the enclosed VCLs and forestlands has taken place in project area, which has increased the availability of feed and fodder.

Table 3.18: Animal Grazing on Common Property Resources by Sample Population

Grazing on CPRs	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Livestock	No.	% Change	No.	% Change	No.	% Change	No.	% Change	No.	% Change	No.	% Change
Before	7.65		6.0364		8.04167		4.1597		5.9297		5.605	
After	3.7	-51.63	3.7364	-38.10	3.77778	-53.02	3.1513	-24.24	3.3672	-43.21	3.6303	-35.23
Difference	-3.95		-2.3		-4.2639		-1.0084		-2.563		-1.975	
Grazing Days												
Before	365		365		365		365		365		365	
After	180	-50.68	190	-47.94	210	-42.46	220	-39.72	320	-12.32	245	-32.87
Difference	-185		-175		-155		-145		-45		-120	

Fodder is a very crucial bio-mass needed for maintaining their livestock. The immediate livelihood impact of creation of enclosures on VCLs, forestlands and grazing lands has been felt with regard to the grazing practices and the availability of fodder from CPRs. The enclosed CPRs are forbidden for open grazing. The cost of restrictions imposed on open grazing in the enclosed area is to be compensated by increased grass production to some extent; the major concern remains one of ensuring fair or equal distribution. However, the usufruct sharing is reportedly inequitable. Most households in fact facing fodder scarcity and resort to one or the other mean to fill the deficit. Under IWDP (Hills-II), Jammu and Kashmir attempts has been made to protect the VCLs, forestlands and grazing lands so that CPRs should be conserved and rehabilitated. Such change has been noticed in both the project area as well as non-project area (See table 3.18). However, the incidence of animal grazing on CPRs has declined comparatively more rapidly in project area than project area without VDC, and more decline in animal grazing has been reported in project area than non-project area. For instance, before project intervention, on average more than 7 animals per household were grazed on CPRs in forested watershed and about 6 animals per household in agricultural watershed. After project intervention, users groups have been created to protect and maintain the enclosed CPRs. Consequently, the average number of livestock grazed on CPRs declined to less than 4, and such a decline is in the range of 38 per cent to 52 per cent, the lowest in agricultural watershed and highest in forested watershed.

Table 3.19: Availability of Forest Products in Sample Sub-Watersheds

Small Timber	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Month (s)	No.	%	No.	%	No.	%	N0.	%	No.	%	No.	%
Below 2	119	51.07	15	13.63	48	66.66	69	57.98	61	47.66	43	36.44
Between 2-4	58	24.89	20	18.18	15	20.83	33	27.73	22	17.19	53	44.91
Between 4-6	30	12.87	74	67.27	2	2.77	7	5.88	17	13.28	15	12.71
Between 6-8	10	4.29	1	0.90	3	4.16	3	2.52	14	10.94	0	0
Between 8-10	4	1.716	0	0	1	1.38	0	0	0	0	0	0
Above 10	10	4.29	0	0	2	2.77	0	0	0	0	0	0
Fuel wood												
Below 2	52	22.31	15	13.63	27	37.5	21	17.64	36	13.79	31	26.27
Between 2-4	86	36.98	20	18.18	28	38.88	56	47.05	41	32.03	59	50
Between 4-6	40	17.16	5	4.54	11	15.27	30	25.21	25	19.53	19	16.10
Between 6-8	12	5.15	70	63.63	3	4.16	5	4.20	15	11.72	1	0.84
Between 8-10	5	2.14	0	0	1	1.38	1	0.84	1	0.78	0	0
Above 10	11	4.72	0	0	2	2.77	5	4.20	0	0	0	0
Fodder												

Below 2	70	30.04	15	13.63	16	22.22	30	25.21	29	22.66	46	38.98
Between 2-4	64	27.46	21	19.09	23	31.94	38	31.93	31	24.22	25	21.18
Between 4-6	58	24.89	73	66.36	8	11.11	44	36.97	33	25.78	10	8.47
Between 6-8	23	9.87	1	0.90	4	5.55	0	0	13	10.16	1	0.84
Between 8-10	7	3.00	0	0	2	2.77	0	0	1	0.78	0	0
Above 10	2	0.85	0	0	6	8.33	0	0	0	0	0	0
Minor Forest Produce												
Below 2	83	35.62	15	13.63	26	36.11	5	4.20	35	27.34	28	23.72
Between 2-4	58	24.89	20	18.18	19	26.38	7	5.88	27	21.09	37	31.35
Between 4-6	58	24.89	5	4.54	6	8.33	11	9.24	26	20.31	24	20.33
Between 6-8	25	10.73	1	0.90	14	19.44	36	30.25	26	20.31	9	7.62
Between 8-10	8	3.43	0	0	0	0	2	1.68	3	2.34	1	0.84
Above 10	0	0	0	0	2	2.77	0	0	0	0	0	0
Deficit Strategy												
Purchase	22	9.44	0	0	2	2.77	32	26.89	1	0.78	0	0
Buffer stock	141	60.51	110	100	72	100	119	100	127	99.22	112	94.91
Fell own Trees	168	72.10	110	100	72	100	119	100	127	99.22	67	56.78
Illicit Felling	137	58.79	110	100	5	6.94	119	100	127	99.22	112	94.91
Rotational Use	8	3.43	0	0	0	0	0	0	0	0	0	0

Not only the number of animals grazed on CPRs has declined, but the number of animal grazing days on CPRs has also declined significantly. For instance, before project intervention, due to open access to CPRs, the animals were grazed throughout the year. Whereas, after the project intervention, the decline in number of animal grazing has been reported in the range of 48 per cent to 51 days in project area with institutional arrangement and 40 days to 42 days in project area without institutional arrangement. Similarly, a decline in animal grazing in the range of 12 per cent to 33 per cent has been recorded in non-project area. It is to be noted that recently the forest department has started enclosing the forests for regeneration and animal grazing has been banned. The creation of closures has resulted in heavy grazing pressure on non-protected and non-enclosed CPRs, which are facing severe degradation. Thus, there is urgent need to introduce new high yielding varieties of grasses and fodder, which could be planted in enclosed CPRs as well as private lands. Besides, more and more user groups need to be created so that equitable usufruct sharing mechanism should be established. The user groups would also be helpful in introducing the system of stall-feeding on wider scale.

The creation of closures on VCLs and forestlands has resulted in significant decline in the availability of forest products, which were freely available before project interventions. After the project interventions, the regeneration of CPRs have taken place, which have improved the availability of forest products

significantly in forested watersheds than the agricultural watershed. However, there are wide variations in availability of forest products across the selected watershed (See table 3.19). The villagers, who are unable to meet their fuel wood, fodder, small timber and minor-forest produce opt for a deficit strategy. The data makes it clear that rotational use of forest resources has been in use only in forested watershed, where institutional arrangements has been made through formation of user groups. In other cases, use of buffer stock, feeling of own trees as well as illicit felling of trees from the local forests are the dominant deficit strategy adopted. It is to be noted that even after the project intervention, illicit felling of trees is most common in agricultural watersheds, where the villagers reportedly intrude the forests in the vicinity to fell the trees to meet the fuel wood and timber requirements.

Economic Impact

IWDP (Hills-II), Jammu and Kashmir intends to rehabilitate the degraded CPRs as a potential strategy for poverty alleviation and livelihood improvement. Besides, environmental rehabilitation and improving the productive potential of the Shivaliks, the project also intend to meet the fuel wood, fodder, minor forest produce and other requirements of the rural poor inhabiting the selected sub-watersheds. Thus, the objective of poverty alleviation emerges very clearly as a concomitant of the objective of environmental rehabilitation. In order to realize the goal, participatory approaches have been evolved in watershed development and protection. In the present chapter, an attempt has been made to examine how far watershed development and protection activities have enabled the people to meet the on-farm and off-farm needs as well as their biomass needs crucial for their livelihood sustenance.

Food Security

The increase in average crop yield in project area is also reflected in levels of food security. The food grain self-sufficiency across the landholding size in given in table 3.20. A mere perusal of the data presented in table makes it clear that

level of food security is comparatively better in project area with VDC than without VDC as well as the project area without VDC and non-project area. The food grains self-sufficiency across the landholding size comparatively more for small and medium farmers and the marginal farmers are still subjected to greater degree of food insecurity. Thus, the rainfed agriculture has not been able to provide food security most particularly in agricultural sub-watersheds, because of less vegetation, lower moisture and water regime. As a result, a significant proportion of the households living in agricultural sub-watersheds are facing food insecurity spread over six months a year, which is to be mitigated by providing alternative livelihood strategies. No doubt, the levels of food security is low from own production in case of marginal farmer, however, the project interventions have significantly improved the overall livelihood security by provisioning wage employment on soil and moisture conservation works, closures of VCLs and forestlands, plantations and nursery development activities, etc.

Table 3.20: Foodgrain Self-sufficiency Across Landholding Size in Sample Sub-Watersheds

Duration	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
(Months)	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
Marginal Farmer												
Below 6	126	61.76	73	72.3	12	19.04	78	70.9	14	14.3	74	76.3
Between 6-9	52	25.49	18	17.8	30	47.61	23	20.9	33	33.7	18	18.6
Above 9	26	12.75	10	9.9	21	33.33	9	8.18	51	52	5	5.15
Total	204		101		63		110		98		97	
Small Farmer												
Below 6	1	4	0	0	0	0	5	62.5	0	0	0	0
Between 6-9	12	48	3	42.9	4	57.14	2	25	2	8.7	9	56.3
Above 9	12	48	4	57.1	3	42.85	1	12.5	22	91.3	7	43.8
Total	25		7		7	0	8		24		16	
Semi-medium Farmer												
Below 6	1	25	1	50	1	50	0	0	0	0	4	80
Between 6-9	3	75	1	50	1	50	0	0	0	0	0	0
Above 9	0	0	0	0	0	0	1	100	6	100	1	20
Total	4		2		2		1		6		5	
Total												
Below 6	128	54.94	74	67.3	13	18.05	83	69.7	14	10.9	74	62.7
Between 6-9	67	28.76	22	20	35	48.61	25	21	35	27.3	22	18.6
Above 9	38	16.31	14	12.7	24	33.33	11	9.24	79	61.7	13	11
Total	233		110		72		119		128		118	

Employment and Income

In the selected sub-watersheds, there is urgent need of livelihood diversification as the levels of food security and overall livelihood security is low. Not only this, whatever type of employment is available to the rural poor, is not sufficient to

meet the basic requirements and poverty is gazing on them. At the same time, it is significant to note that wage employment has been provided to on project interventions. The most of the project interventions have been implemented in the project area where participatory institutions have been created through formation of VDCs/user groups than the project area without VDC. In the non-project area also, various government departments are implementing development programmes on which wage employment has been generated. Specifically, the rural development programmes are being implemented to alleviate the poverty, which is creating wage employment through creation and maintenance of community assets and other basic rural infrastructure.

Table 3.21: Period of Employment of Respondents' Family in Sample Sub-Watersheds

Period	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Months	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
Below 2	46	19.74	9	8.18	12	16.667	16	13.4	11	8.59	16	13.6
Between 2-4	96	41.2	33	30	29	40.278	57	47.9	38	29.7	77	65.3
Between 4-6	31	13.3	8	7.27	13	18.056	15	12.6	46	35.9	8	6.78
Between 6-8	17	7.296	40	36.4	7	9.7222	14	11.8	22	17.2	4	3.39
Above 8	43	18.45	20	18.2	11	15.278	17	14.3	11	8.59	13	11
Total	233		110		72		119		128		118	

In the project area with VDC, wage employment is available to about 40 per cent and 54 per cent of respondents for an extended period of 6 months a year in forested and agricultural sub-watershed respectively. In the project area without VDC and non-project area, wage employment is available to about one-fourth and one-fifth of the respondents respectively for more than 6 months a year. Thus, it is not wrong to infer that project interventions have generated much needed wage employment and supplemented the livelihood strategies of the rural poor, which is further reflected in comparatively higher average monthly income in project area than non-project area (See table 3.21). There are wide variations in average monthly income from farm and non-farm occupation across the selected sub-watersheds and is comparatively high in project area than non-project area. The project has facilitated in opeartionalizing non-farm activities by provisioning the necessary training, skills and inputs to the beneficiaries. After the project interventions, the farm households have significantly improved their

livelihood options and a large proportion of them are reportedly above the poverty line (APL).

Table 3.22: Annual Income from Farm and Non-farm Occupation in Sample Sub-Watersheds (Rs.)

	Project area with VDC		Project area without VDC		Non-project area	
Occupation	Forested WS	Agrl. WS	Forested WS	Agrl. WS	Forested WS	Agrl. WS
Farm						
Marginal Farmer	10668	11208	8808	9744	8100	8544
Small Farmer	15660	17304	13848	13872	11832	9888
Semi-medium Farmer	17340	18408	15864	14952	12240	10512
Total						
Non-farm						
Dairy	5472	6420	2620	4020	1512	1032
Poultry	4140	3072	1740	1488	1152	672
Goatry	2820	2100	1152	2580	648	408
Bee-keeping	3048	3312	540	540	648	420
Other	10380	15360	10380	5184	4140	5088

The Jammu and Kashmir Government, which carried out the BPL census in 1997 and used the cut off for defining a household appearing as below the poverty line (BPL) of Rs 11,000 per household per annum. This was also the figure used by the Planning Commission in the Eighth Plan. This figure has been revised upwards by taking the Consumer Price Index (CPI) for Agricultural Labourers for Jammu and Kashmir (Monthly Abstract, Jan.-March 2001; December 2001; June, 1999). The average index for 1997-98 (twelve months) is 263. The average for 2001-02, for which we have income data, the average index (nine months) is 329.56 (1986-87=100). In other words, there was a 25.31 per cent increase in the price index. The adjusted income figure comes to Rs, 13,784.10 that have been used as the cut off for poverty line in 2001-02. Another problem concerns the average size of the household. The average size of the household in the sampled households is above 5 persons, which is higher than the national average. Since the Jammu and Kashmir government has used the income figure of the Eighth Plan for defining the cut off for the poverty line, the relevant household size is that of the national average rather than that of Jammu and Kashmir. In other words, an adjustment has to be made, as the household size in sample area is larger than the national household average. The figure of Rs 13,784.10 has been revised upwards to the same extent, as the household size in sample area is larger than the national average household size. This will give us the second estimate of the number crossing the poverty line. The second

revised figure for the household crossing the poverty line is Rs 15,686.31 in 2001-02, which has been used in the present study.

It is to be noted that the project has provided various types of assistance for farm and non-farm activities mainly to the members of BPL families identified by the VDCs, panchayats and/or local leadership. The average annual income of the marginal farmers from farming occupation alone is comparatively less than the cut-off level of BPL across the selected sub-watersheds (See table 3.22). In the project area with VDC, semi-medium farmers in forested watershed and small and semi-medium farmers in agricultural watershed have reportedly crossed the poverty line after the project intervention. In the project area without VDC, the semi-medium farmers in forested watershed have improved their livelihood status after project intervention and are found in the category of APL. The small and marginal farmers are still living in poverty, if we assume that they are deriving their earning solely from farm activities. The poverty is widespread in non-project area. It is to be noted that care has been taken to include those of the BPL population who are beneficiaries of one or the other anti-poverty scheme operational in the area. However, as mentioned earlier, the project has benefited the poor by providing wage employment on watershed development and protection activities as well as in upgrading traditional non-farm activities such as dairy, poultry, bee-keeping, etc. The exact level of income from non-farm activities by farmers' category is not available. However, on rough approximation, the income from non-farming activities taken together with farm earnings ease the poverty situation, more specifically in those villages where participatory approaches has been evolved. For instance, in project area with VDC, dairy supplement the average household income to the tune of Rs. 6421 per annum and average income from other non-farm sources (predominantly wage employment through project intervention) is as high as Rs. 15,360 per year in agricultural watershed. Besides, poultry and goat rearing are also important non-farm income yielding activities in project area. Thus, the poor farmers are engaged in multiple activities to eke out a livelihood. One thing which is quite

evident from the above is that poverty scenario have improved though modestly in the project area without VDC and significantly in project area with VDC.

Consumption of CPRs Products

The table 3.23 gives the data on average annual household consumption and the value of CPRs products collected by the sample population. A mere perusal of the data makes it evident that fuel wood collected from CPRs has declined very sharply in agricultural watershed in project area without VDC followed by agricultural and forested watershed in project area with VDC. The decline in fuel wood collected from CPRs in non-project area has also been reported, however, in fewer amounts than project area, which may be attributed to protection of forests by forest department, and/or decline in the potential of CPRs due to severe degradation. Similarly, decline has been noticed in fodder collection after project intervention. The decline in fodder collection is reportedly very sharp in project area with VDC. In non-project area too, a marginal decline has been reported in fodder collection. A decline in collection of timber and non-timber products and manure has been noticed. However, with project interventions, the value of horticultural product collected from CPRs has increased though modestly. Similar trend can also be noticed in non-project area.

Table 3.23: Average Annual Household Consumption and CPRs Products Collected by Sample Population

CPRs Products Collected	Average Annual Household Consumption (Rs.)											
	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Fuelwood	Rs.	% Change	Rs.	% Change	Rs.	% Change	Rs.	% Change	Rs.	% Change	Rs.	% Change
Before	3424		3240		4324		4645		4566		4765	
After	1645	-51.95	1268	-60.86	3422	-20.86	2342	-49.58	3865	-15.35	4388	-7.91
Difference	-1779		-1972		-902		-2303		-701		-377	
Fodder												
Before	4685		4586		4690		4885		4656		4322	
After	2386	-50.92	3215	-29.89	3425	-26.97	3864	-20.90	4536	-2.57	4020	-6.98
Difference	-2299		-1371		-1265		-1021		-120		-302	
Horticultural Products												
Before	657		334		458		342		272		124	
After	865	31.65	486	45.50	643	40.39	536	56.72	514	88.97	271	118.54
Difference	208		152		185		194		242		147	
Non-timber Products												
Before	865		654		579		634		565		520	
After	453	-47.63	435	-33.48	455	-21.41	598	-5.67	534	-5.48	485	-6.73
Difference	-412		-219		-124		-36		-31		-35	
Average Annual CPRs Products Collected (Rs.)												
Food												
Before	435		534		342		245		185		230	
After	546	25.51	864	61.79	428	25.14	337	37.55	56	-69.72	48	-79.13
Difference	111		330		86		92		-129		-182	
Fodder												

Before	5399		4685		5320		5643		5434		4558	
After	6656	23.28	7215	54.00	5960	12.03	6756	19.72	4536	-16.52	4020	-11.80
Difference	1257		2530		640		1113		-898		-538	
Fuelwood												
Before	4224		3865		4534		4985		4985		4890	
After	1645	-61.05	1268	-67.19	3422	-24.52	2342	-53.01	3865	-22.46	4388	-10.26
Difference	-2579		-2597		-1112		-2643		-1120		-502	
Manure												
Before	400		435		356		170		249		286	
After	254	-36.5	234	-46.20	143	-59.83	67	-60.58	56	-77.51	79	-72.37
Difference	-146		-201		-213		-103		-193		-207	
Timber												
Before	1865		2436		1563		2306		1486		2366	
After	258	-86.16	324	-86.69	354	-77.35	263	-88.59	85	-94.27	124	-1808.06
Difference	-1607		-2112		-1209		-2043		-1401		-2242	

In the project area with VDC, the decline in fuelwood collected from CPRs was to the tune of 51.95 per cent and 60.86 per cent respectively in forested and agricultural sub-watersheds. It was 20.86 per cent and 49.58 per cent respectively in project area without VDC. The decline in fuelwood collection from CPRs has taken place in non-project area also, but at a very slow pace, and it was reportedly 15.35 per cent and 7.9 per cent respectively in forested and agricultural sub-watersheds. More or less, a similar trend can be noticed for fodder and non-timber products collection from CPRs across the sample area. In case of horticultural products collected from CPRs, an increased was noticed in the selected sub-watersheds. The increase was significantly marked in non-project area and project area without VDC, but when we observe the data in rupees terms, the amount of horticultural products collected from CPRs was significantly higher in project area with VDC than project area without VDC and non-project area. It is to be noted that collection of food and fodder from CPRs has declined significantly over the period in non-project area, whereas a positive trend was visible for project area with VDC and without VDC. Over the period, the fuelwood, manure and timber collection from CPRs have declined across the sample area, however, the decline is markedly high in non-project area than project area with VDC and without VDC. Thus, it can be inferred that with project interventions, the productivity of CPRs has increased very rapidly in project area with VDC followed by project area without VDC compared to non-project area.

The annual fuel wood consumption from CPRs has declined after the project intervention. The decline in average fuel wood consumption was reportedly high

in project area than non-project area. (See table 3.24). The average decline in fuel wood consumption from CPRs was high in project area with VDC followed by project area without VDC and non-project area. On average, the decline in food wood consumption was 44.22 per cent and 46.13 per cent respectively in forested and agricultural sub-watersheds in project area with VDC. In project area without VDC, the decline was to the tune of 37.83 per cent and 40.18 per cent respectively in forested and agricultural sub-watersheds. The decline was comparatively low in non-project area and stood at 15.39 per cent and 24.22 per cent respectively in forested and agricultural sub-watersheds. It is significant to note that decline in fuel wood consumption varies over the year. The highest decline is reported in winter followed by monsoon and summer seasons. The selected sub-watersheds are experiencing extreme weather conditions, where fuel wood consumption is comparatively high in winter, whereas, the highest decline is also recorded in the same season. On inquiry, it was revealed that they meet their fuel wood requirement in winter from the buffer stock maintained to meet the contingencies and those of the poor households, who were unable to do so, face acute hardships in the absence of alternative sources of fuel supply.

Table 3.24: Average Annual Households' Fuelwood Consumption from CPRs by Sample Population

	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Fuel wood Consumption	Kg.	% Change	Kg.	% Change	Kg.	% Change	Kg.	% Change	Kg.	% Change	Kg.	% Change
Monsoon												
Before	422		398		458		406		356		308	
After	248	-41.23	204	-48.74	286	-37.55	184	-54.67	324	-8.98	234	-24.02
Difference	-174		-194		-172		-222		-32		-74	
Winter												
Before	548		522		512		447		389		364	
After	288	-47.44	296	-43.29	324	-36.71	311	-30.42	346	-11.05	294	-19.23
Difference	-260		-226		-188		-136		-43		-70	
Summer												
Before	346		335		423		349		314		265	
After	198	-42.77	176	-47.46	256	-39.47	224	-35.81	226	-28.02	182	-31.32
Difference	-148		-159		-167		-125		-88		-83	
Average												
Before	438.6		418.3		464.33		400.66		353		312.33	
After	244.6	-44.22	225.3	-46.13	288.66	-37.83	239.66	-40.18	298.66	-15.39	236.66	-24.22
Difference	-194		-193		-175.67		-161		-54.34		-75.67	

Economic Impact of Crop Yield, Livestock and CPRs

The table 3.25 is devoted to analyze the overall economic impact of the project on crop yield, livestock and CPRs. A perusal of the table makes it evident that

except number of milch animals per household and monetary value of the fuel wood collected from CPRs, all other items shows a positive difference between project and non-project area. This clearly reflects that over the project period, the livestock population has declined significantly in project area. Similarly, due to creation of closures on VCLs and forestlands, the collection of fuel wood has declined to the tune of Rs. 1957.25 in project area. The crop yield of major crops was significantly higher in project area than non-project area. The difference in crop yield of maize, paddy and pulses respectively stood at 1.45 quintal, 1.65 quintal and 0.39 quintal per hectare.

Table 3.25: Economic Impact of Crop Yield, Livestock and CPRs in Project and Non- Project Are

Items			
Crop Yield (quintal/Ha.)	**Project Area**	**Non-Project Area**	**Difference**
Maize	9.05	7.6	1.45
Paddy	6.1	4.45	1.65
Pulses	2.54	2.15	0.39
Livestock			
Milch Animals (No./per HH)	3.15	4.1	-0.95
Milk Yield (kg)			
Cows	3.88	2.88	1
Buffalo	5.06	3.75	1.31
Sheep (per HH)	3.6	1.1	2.5
Wool Yield (kg.)	2.075	0.9	1.18
CPRs			
Horticulture Plantation (per Ha)	224	67.5	156.5
Fodder Collection (Rs.)	4446.75	4278	168.75
Green Fodder Collection (kg.)	371.25	216.5	154.75
Dry Fodder Collection (kg.)	35	18.3	16.7
Fuel Wood (Rs.)	2169.25	4126.5	-1957.25

Similarly, a significant differential in milk yield has been recorded between project area and non-project area. The difference in milk yield of cows and buffalo stood at 1.0 kg and 1.31 kg respectively. The difference in number of sheep per household and wool yield was also quite significant between project area and non-project area and stood at 2.5 sheep and 1.18 kg of wool respectively. The performance of CPRs was reportedly remarkable. For instance, the number of horticultural plantations on CPRs was comparatively more in project area than non-project area. And the difference between the two stood at 156.5 plantations

per hectare of CPRs. Besides above, the fodder collection from CPRs has also significantly high both in monetary as well as volume terms.

Table 3.26: Benefit - Cost Ratio of Selected Project Interventions

Intervention	Cost (Rs.)	Benefit (Rs.)	B/C
Livestock			
Milch Animals	162.86	3798	23.32
Sheep rearing	141.89	236	1.66
CPRs	640.76	-1788.5	-2.79
Rainfed Crops Demonstration	146.26	81.93	0.56
On -form Fodder Production	415.88	547.75	1.31
Total	1507.65	2875.18	1.90

The benefit-cost ratio of selected project interventions is presented in table 3.26. A perusal of the table makes it clear that the livestock intervention has the highest benefit-cost ratio, which is estimated at 23.32. The annual benefit accruing to the individual beneficiary owning milch animals was to the tune of Rs. 3798 per annum, whereas the project cost on livestock intervention was reportedly Rs. 162.86. Similarly, sheep rearing has been also taken by transhumance as well as settled tribal population in a significant way and the livestock intervention in sheep rearing has resulted in a benefit to the tune of Rs. 236 per beneficiary. In case of sheep rearing, the benefit-cost ratio is estimated at 1.66. The other important intervention with significant benefit-cost ratio is on-farm fodder production. However, project intervention in rainfed crop demonstration has a low benefit-cost ratio. The project intervention on CPRs closures, plantations, etc. has a high negative value of 2.79. This is due to the fact that CPRs were mainly closed for regeneration and even the benefits, which the beneficiaries were driving before project intervention, were not accruing to them due to strict enforcement of rules in use by the VDCs. On the whole, the benefit-cost ratio is estimated at 1.9, which is very significant. However, when we take into account the total average transaction costs incurred by the project implementing agency and individual beneficiary, the overall benefit-cost ratio falls. Thus, the minimization of transaction costs has a positive influence on enhancing the benefits from participatory watershed development.

Perceptions of the Respondents on Environmental-Economic Impact

Besides quantitative analysis of the environmental and economic impact of the participatory approaches, perceptions of the local inhabitants are also highly useful in analyzing the environmental-economic impacts. IWDP (Hills-II), Jammu and Kashmir have resulted in partial/complete termination of customary rights over forest and pasture resource which they had traditionally been using since generations. The access to protected VCLs and forestlands is strictly prohibited till it regenerates. The majority of the respondents felt that agriculture and livestock productivity got reduced as a result of termination of their traditional rights. A significant proportion of the respondents stressed that their livelihood was badly affected due to ban on NTFPs collection for income. Most of the degraded land area is in the vicinity of the settlements. Improvement in productivity of degraded forestlands implies regeneration of biodiversity and ecosystem functions, reduction in unproductive labour involved in collection of basic fuel wood and fodder needs from the distant forests and reduction in threats to watershed. Past ecosystem redevelopment efforts have concentrated on tree planting in degraded VCLs and forestlands. Such activities funded by the government did benefit local people in the form of wages earned by them. However, these plantations could not make a significant ecological impact. This failure could be due to a variety of reasons. First local priorities for plantation species were not looked in to and so people were not deeply involved in protection of plantations. Second, it was presumed that trees could tolerate all sorts of soil and water stress and so these stresses were not ameliorated at the time of planting.

Forests and pastures, which constitute the landscape matrix, are important from the point of tangible benefits to the local population and ecosystem services to the wider society. There were no formal institutions in the traditional system. Management related decisions were taken when village communities assembled for religious ceremonies. Lead roles were decided based on the expertise of individuals rather than formal institutions. Formal institutions emerged following the project interventions. There are village level statutory institutions such as

VDCs and users groups. These institutions have played a very significant role in those of the villages where it has been created and operationalized. Though radical changes were made in traditional land tenure, the age old traditional practices that are still continuing include: forest litter, tree fodder and fuel wood are available in sufficient quantities in the selected sub-watersheds and are collected by the local population for self consumption. The handicrafts items made from the forest resources are used for self-consumption, but are marketed by socially underprivileged ones.

Under IWDP (Hills-II), enclosures have been created for regeneration of forests, which could be open to the community after a regeneration of 3-4 years. However, this requirement is not observed at all. In the non-project area, forest enclosures did not exist and the users decided uses without taking in to consideration the productive capacity, which results in severe decline in the productivity of the forest resources. Impact of disturbances due to cutting of large size top canopy trees and fire are likely to accompany more drastic changes as compared to the changes due to traditional uses of non-timber forest products. Intense disturbance due to tree removal is more common in forested sub-watershed of Ramnagar than Akhnoor. Fire, though not permitted legally, is used by the local communities to enhance productivity of palatable grasses only in the forested sub-watershed of Akhnoor, which are poor in terms of availability of tree fodder. The area is subject to surface fire before the onset of rainy season to promote growth of palatable grasses to meet the immediate fodder needs.

Table 3.27: Perception Regarding Regeneration of Vegetation and Reduction in RainwaterLoss

Perception Regarding	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	N0.	%	No.	%	No.	%
Regeneration of Vegetation												
Yes	190	81.54	95	86.4	37	51.38	56	47.05	44	34.38	39	33.05
No	39	16.73	12	10.9	23	31.94	38	31.93	57	44.53	43	36.44
Can't Say	4	1.71	3	2.73	12	16.66	25	21.00	27	21.09	36	30.51
Total	233		110		72		119		128		118	
If Yes												
High	86	45.26	43	45.3	19	51.35	24	42.85	14	31.82	8	20.51
Medium	54	28.42	23	24.2	12	32.43	17	30.35	11	25	16	41.03
Low	50	26.31	29	30.5	6	16.21	15	26.78	19	43.18	15	38.46
Reduction in Rain Water Loss on Barren Hills												
Yes	191	81.97	87	79.1	53	73.61	76	63.86	43	33.59	33	27.97
No	32	13.73	12	10.9	12	16.66	34	28.57	38	29.69	71	60.17
Can't Say	10	4.29	11	2.7	7	9.72	9	7.56	47	36.72	14	11.86

Total	233		110		72		119		128		118	
If Yes												
High	118	61.78	53	60.9	24	45.28	38	50	17	39.53	13	39.39
Medium	41	21.46	23	26.4	18	33.96	29	38.15	12	27.91	9	27.27
Low	32	16.75	11	12.6	11	20.75	9	11.84	14	32.56	11	33.33

During the field survey and PRA exercises, perceptions of the people living in the selected sub-watersheds has been ascertained regarding environmental impacts of the project intervention, which clearly reveals that watershed development and protection have had significant impact on conservation/regeneration of resources. The respondents' perceptions regarding regeneration of vegetation and reduction in rainwater loss due to project interventions is given in table 3.27. A perusal of the data given in the table makes it clear that more than 80 per cent of the respondents in project area with VDC perceived that regeneration of vegetation has taken place after project interventions. Whereas, about half of the respondent in project area without VDC perceived that that regeneration of vegetation has taken place. About one-third of the respondents in non-project are perceived that regeneration of vegetation has taken place durring the recent past. It is to be noted that forest enclosures have also been created in non-project area under forest protection programme. Besides, social forestry programme, which are being carried out in the non-project area has also helped improved the regeneration of vegetation. Of those who perceived that regeneration gas taken place after the project intervention, a significant proportion of them reported that regeneration was comparatively more in project area with VDC than project area without VDC, and further comparatively better in project area without VDC than the non-project area. Similarly, significant variations in perceptions regarding reduction in rain water loss on barren hills due to regeneration of vegetation has been notified across the project area with VDC and without VDC and the project area and non-project area. A large proportion of the respondents in project area perceived that regeneration of vegetation has resulted in reduction in rainwater loss on barren hills, which have also contributed significantly in further growth of vegetation. Of those, who perceived increased in water retention capacity due to regeneration of vegetation, more than 60 percent of them were found in project area with VDC and without VDC. In the non-project

area, about a third of the respondents perceived that regeneration of vegetation helps in improving the water retention capacity and thus rainwater loss has declined significantly on barren hills, but they were not clear about the extent of reduction of rainwater loss.

Table 3.28: Perception Regarding Improvement in Surface and Ground Water

Perceptions	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	N0.	%	No.	%	No.	%
Improvement in Surface Water Regime												
Yes	178	76.39	95	86.4	53	73.61	76	63.86	43	33.59	46	38.98
No	41	17.59	12	10.9	15	20.83	34	28.57	38	29.69	34	28.81
Can't Say	14	6.00	3	2.73	4	5.55	9	7.56	47	36.72	38	32.2
Total	233		110		72		119		128		118	
If Yes												
High	112	62.92	41	43.2	29	54.71	27	35.52	9	20.93	16	34.78
Medium	38	21.34	22	23.2	21	39.62	16	21.05	12	27.91	19	41.3
Low	28	15.73	32	33.7	3	5.66	33	43.42	22	51.16	11	23.91
Improvement in Ground Water Regime												
Yes	147	63.09	67	60.9	46	63.88	66	55.46	63	49.22	41	34.75
No	56	24.03	29	26.4	17	23.61	30	25.21	45	35.16	47	39.83
Can't Say	30	12.87	14	12.7	9	12.5	23	19.32	20	15.63	30	25.42
Total	233		110		72		119		128		118	
If Yes												
High	98	66.66	26	38.8	28	60.87	22	33.33	12	19.05	9	21.95
Medium	33	22.44	23	34.3	13	28.26	17	25.75	15	23.81	21	51.22
Low	16	10.88	18	26.9	5	10.87	27	40.90	36	57.14	11	26.83

A majority of the respondents in project area perceived that watershed development activities have improved both the surface and ground water regime. However, there are significant variations in perceptions regarding the improvement in water resources across the project area with VDC and without VDC as well as forested and agricultural watersheds (See table 3.28). More than three-fourth of the respondents in the project area with VDC perceived an improvement in improvement in surface water regime and more than 60 per cent of them perceived an improvement in ground water regime after the project intervention. There are significant variations in the level of improvement in the surface and ground water regime across the project and non-project area, as perceived by the respondent. Of those, who perceived an improvement in water regime after project interventions, a majority of them belong to forested watershed in project area with VDC. The non-project area is reportedly more water scarce. During summer, the availability of water worsens further, which

clearly reflect the urgency of initiation of watershed development and protection in the region.

Table 3.29: Perception Regarding Increase in Irrigation Facilities and Area under Irrigated Cropping

Perception Regarding	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	N0.	%	No.	%	No.	%
Increase in No. of Dug Wells / Pond / Tank												
Yes	152	65.23	69	62.7	43	59.72	66	55.46	32	25	37	31.36
No	67	28.75	26	23.6	21	29.16	34	28.57	79	61.72	72	61.02
Can't Say	14	6.00	15	13.6	8	11.11	19	15.96	17	13.28	9	7.627
Total	233		110		72		119		128		118	
If Yes												
High	98	64.47	37	53.6	23	53.48	32	48.48	7	21.88	9	24.32
Medium	36	23.68	22	31.9	14	32.55	14	21.21	12	37.5	17	45.95
Low	18	11.84	10	14.5	6	13.95	20	30.30	13	40.63	11	29.73
Construction of Check Dams Taken Place												
Yes	50	21.45	14	12.7	11	15.27	19	15.96	6	4.68	7	5.932
No	179	76.82	74	67.3	56	77.77	93	78.15	117	91.41	103	87.29
Can't Say	4	1.716	22	20	5	6.94	7	5.88	5	3.90	8	6.78
Total	233		110		72		119		128		118	
If Yes												
High	12	24	4	28.6	3	27.27	4	21.05	0	0	0	0
Medium	17	34	7	50	5	45.45	7	36.84	2	33.33	4	57.14
Low	21	42	3	21.4	3	27.27	8	42.10	4	66.67	3	42.86
Increase in Area Under Irrigated Cropping												
Yes	23	9.87	12	10.9	5	6.94	4	3.36	6	4.68	8	6.78
No	210	90.12	98	89.1	67	93.05	115	96.63	122	95.31	110	93.22
Can't Say	0	0	0	0	0	0	0	0	0	0	0	0
Total	233		110		72		119		128		118	
If Yes												
High	0	0	0	0	0	0	0	0	0	0	0	0
Medium	0	0	3	25	4	80	0	0	0	0	2	25
Low	23	100	9	75	1	20	4	100	6	100	6	75

The table 3.29 reveals that more than half of the respondents perceived that number of water points have increased after project intervention. The project with community participation has renovated and repaired the degraded water points by removing the silts and creating the cemented structures to protect against the floods during rainy season. During the recent past, the government and non-government agencies have also attempted to rejuvenate the traditional water sources in the non-project area to solve the severe problem of water scarcity, especially in agricultural watershed. The small check dams have also been constructed in the project area with active participation of the user groups. It has been reported that the task construction on the comparatively large check dams has been entrusted to private contractors, who brought the most of hired labour from outside the village and thus even the local villagers were denied the

opportunities for wage employment on such construction activities. This type of arrangement has been reported in forested village Chigial in Akhnoor sub-watershed, which has a VDC also. The project has also involved the local population in repairing the traditional irrigation channels (khuls), which has improved the irrigation potential in the project area with VDC and resulted in an increase in area under irrigated cropping though modestly.

Table 3.30: Perception of Respondents about Impact of Vegetative Bunding

Perceived Impact	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
Improved Soil Moisture												
Yes	230	98.71	110	100	72	100	119	100	118	92.18	117	99.15
No	0	0	0	0	0	0	0	0	10	7.81	1	0.84
Not certain	3	1.28	0	0	0	0	0	0	0	0	0	0
Total	233		110		72		119		128		118	
Reduction in Soil Erosion												
Yes	215	92.27	110	100	72	100	114	95.8	116	90.62	111	94.06
NO	15	6.43	0	0	0	0	5	4.20	12	9.37	7	5.93
Not Certain	3	1.28	0	0	0	0	0	0	0	0	0	0
Total	233		110		72		119		128		118	
Increase in Crop Yield												
Yes	138	59.22	0	0	0	0	8	6.723	7	5.46	7	5.93
No	95	40.77	110	100	72	100	111	93.28	111	86.71	111	94.06
Not Certain	0	0	0	0	0	0	0	0	10	7.81	0	0
Total	233		110		72		119		128		118	
Better Crop Survival												
Yes	7	3.00	0	0	0	0	1	0.84	5	3.90	2	1.69
No	226	96.99	110	100	72	100	118	99.16	98	76.56	115	97.45
Not Certain	0	0	0	0	0	0	0	0	25	19.53	1	0.84
Total	233		110		72		119		128		118	
Change in Fertilizer Use												
Yes	213	91.41	57	51.82	63	87.5	91	76.47	82	64.06	114	96.61
No	12	5.15	26	23.64	0	0	1	0.84	34	26.56	2	1.69
Not Certain	8	3.43	17	15.45	9	12.5	27	22.69	12	9.37	2	1.69
Total	233		110		72		119		128		118	

The table 3.30 gives the data on respondents' perceptions about impact of vegetative bunding on soil moisture, soil erosion, crop yield, crop survival and fertilizer use. There are significant variations across the selected sub-watersheds as well as project and non-project area regarding respondents' perceptions about the impact of vegetative bunding. The majority of the respondents across the sampled villages in project as well as non-project area perceived that wherever vegetative bunding has been used, the soil moisture regime has improved and soil erosion has declined. About 59 percent of the respondents in forested watershed of Ramnagar in project area with VDC reported that due to propagation of vegetative bunding by the project and consequent increase in soil

moisture, the yield has also reportedly increased. In other areas, the respondents perceived that the use of vegetative bunding has not increase the crop yield. Large proportion of the respondents perceived that vegetative bunding has no significant impact on crop survival. However, a majority of the respondents across the selected sub-watersheds perceived that vegetative bunding has affected the fertilizer use very significantly. On the whole, the project has propagated the use of vegetative bunding to improve the soil moisture regime of the area. It has increased the water retention capacity of the soil, reduced the soil erosion and improved the crop yield and crop survival as well as affected the fertilizer use. However, due to poor agricultural extension services, the farmers were not clear about the positive impact of use of vegetative bunding, which should be taken care of in future by the field functionaries.

Over the period, with the creation of VCLs and forest closures, and plantation of vetiver grasses on the private lands, fodder availability has increased though modestly in the project area. The villagers have started replacing local cows and buffaloes with crossbred animals, which are stall fed and thus reducing the grazing pressure. The respondents in project area perceived that with increase in fodder availability, off-seasonal income of those of the farmers, who derive some income from the sale of the fodder has increased. Increased fodder availability also provided the farmers a cushion during drought period, which is more frequent in the Shivaliks. With the increased fodder availability from VCLs and forest closure, additional crop activities have been carried on agricultural lands, which were earlier kept for fodder production. Some of the farmers have also started rearing additional cattle, mostly cross-bred and some of them have taken to petty trading and engaged in handicrafts. However, such cases are few and far between. On the whole the cattle population has declined and the crossbred animals are replacing the local cattle.

Table 3.31: Perceptions Regarding Fodder Availability by Sample Population

	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Perception Regarding	No.	%	No.	%	No.	%	N0.	%	No.	%	No.	%
Increase in Fodder Availability												
Yes	198	84.97	69	62.72	53	73.61	46	38.65	24	18.75	7	5.93
No	35	15.02	41	37.27	19	26.39	73	61.34	104	81.25	111	94.07

Can't Say	0	0	0	0	0	0	0	0	0	0	0	0
Total	233		110		72		119		128		118	
If Yes												
Significant	112	56.56	13	18.84	12	22.64	0	0	0	0	0	0
Moderate	47	23.73	22	31.88	23	43.4	6	13.04	9	37.5	2	28.57
Marginal	39	19.69	34	49.27	18	33.96	40	86.95	15	62.5	5	71.43
Benefits From Increased Fodder Availability												
Off-Seasonal Income	156	78.78	59	85.50	37	69.81	23	50	13	54.17	5	71.43
Drought Period Sustenance	163	82.32	52	75.36	43	81.13	33	71.73	8	33.33	3	42.86
Additional Crop Activities	107	54.04	65	94.20	36	67.89	40	86.95	11	45.83	5	71.43
Additional Cattle	167	84.34	36	52.17	37	69.81	24	52.17	7	29.17	4	57.14
Petty Trading/ Handicraft	23	11.61	9	13.04	8	15.09	4	8.69	2	8.33	3	42.86

The closures and rejuvenation of VCLs and forestlands and plantation activities on private lands have improved fuel wood availability though marginally. It is interesting to note that fuel wood availability is comparatively more in non-project area and project area without VDC (See table 3.32), which clearly reveals that, protected and enclosed VCLs and forestlands have not started giving the desired results. The majority of the respondents perceived that increased fuel wood availability has been conducive for resource conservation and stability of farming system and acted as sustenance for the rural poor and resulted in more renewable resource supply. It is to be noted that there is a time lag between resource protection and outcomes, and it is expected that after an interval of 2-3 years, higher fuel supply would take place from the enclosed VCLs and forestlands as well as private lands. The project has also protected and enclosed the degraded VCLs and forests, which have resulted in decrease in free grazing area. The access to protected common lands has also been restricted, which has resulted in an increase in dry forage production. In the project area with VDC, the respondents reported that project interventions have reduced the free grazing area and free access to community land has curtailed, because the degraded common land has been protected and enclosed for regeneration. The protection and subsequent regeneration of common lands is reportedly very high in project area with VDC than in project area without VDC. In non-project area, the grazing lands as well as VCLs and forestlands are subjected to severe grazing pressure due to open access and their productivity has declined very significantly. It is to be noted that during the recent past, government agencies in non-project area have enclosed VCLs and common lands for regeneration, however, due to non-participation of the local community in regeneration programme, these protected

resources are even now more or less open access. The increase in dry forage production and more availability of green fodder has contributed significantly in improving the livestock health and productivity, which is reflected in higher milk yields, saving of time and introduction of system of stall feeding in the project area with VDC.

Table 3.32: Perceptions Regarding Fuelwood Availability by Sample Population

	Project area with VDC				Project area without VDC				Non-project area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Perception Regarding	No.	%	No.	%	No.	%	N0.	%	No.	%	No.	%
Increased in Fuelwood Availability												
Yes	19	8.15	12	10.90	14	19.44	17	14.28	19	14.84	9	7.627
No	214	91.84	98	89.09	58	80.56	102	85.71	109	85.16	109	92.37
Can't Say	0	0	0	0	0	0	0	0	0	0	0	0
Total	233		110		72		119		128		118	
If Yes												
Significant	0	0	0	0	0	0	0	0	0	0	0	0
Moderate	6	31.57	4	33.33	3	21.43	4	23.52	7	36.84	2	22.22
Marginal	13	68.42	8	66.66	11	78.57	13	76.47	12	63.16	7	77.78
Benefits From Increased Fuelwood Availability												
Resource Conservation	14	73.68	8	66.66	11	78.57	15	88.23	15	78.95	6	66.67
Stability of Farming System	9	47.36	10	83.33	13	92.86	12	70.58	17	89.47	4	44.44
Sustenance of Poor	15	78.94	7	58.33	9	64.29	14	82.35	12	63.16	7	77.78
Renewable Resource Supply	17	89.47	11	91.66	10	71.43	16	94.11	10	52.63	8	88.89

In the project area, horticultural plantations and rejuvenation activities have been carried out, which have significantly increased the area under fruit plantations. The project functionaries have distributed fruit plants of mango, orange, pomegranate, guava, grapes, banana, kinno, pear and papaya to the beneficiaries on cost sharing basis. The fruit plantations have also been reported in non-project area; however, these have not been treated through grafting with improved quality. As a result, the yield of fruits has been reportedly low. The respondents revealed that fruit production is severely effected by the pests and insects. The training facilities to improve the skill are not available to the interested fruit growers. When we compare the horticultural performance in project area with VDC and project area without VDC, more or less similar picture emerges for forested and agricultural watersheds. However, the field visits to the project area revealed that forested watershed have better potential for horticultural rejuvenation. About one-third of the respondents perceived that area

under private plantations has increased after project interventions. The horticulture, sericulture and timber plantations have been planted in the project area, for which project has maintained a few nurseries in both the sub-watersheds. The tree saplings have been distributed to the beneficiaries on cost sharing basis. The plantation activities on private lands have significantly improved the fuel wood and forage availability. The dependence on VCLs and forestlands has declined sharply, which contributed significantly in rejuvenating the VCLs and forest closures. The private plantation in non-project area is negligible, which compels the villagers to depend heavily on VCLs and forestlands for fuel wood and fodder requirements. With project intervention and regeneration of enclosed and protected VCLs, forestlands and tree plantations on private lands, the fuel wood availability has increased in project area. As a result, the farmers are using cow dung manure on cropland, which was earlier used for meeting household energy requirement especially for cooking purposes. With project interventions and increased livelihood options, fuel wood availability has increased in the project area though modestly. The participatory institutions have also facilitated in equitable usufructs sharing among the members. The equitable benefit sharing arrangements have benefited more the landless labourers, and small and marginal farmers than the comparatively large land-owning households. The large land owning households can meet their fuel wood requirements from their own lands as well as through the use of alternative sources of energy supply such as efficient chullah and biogas plant. Alternative sources of rural domestic energy do not cause forest degradation. Substitution from fuel wood to these alternative sources can reduce pressure on natural forests. In addition, more widespread use of improved stoves, biogas, and other improved end use technologies through reduced energy input requirement also has the potential to reduce pressure on forest resource. The same can be said about improved functioning of local natural resource management institutions and efforts at promoting participatory resource management. Thus, a better understanding of the determinants of rural household’s fuel substitution and

adoption of improved energy conversion technologies is essential for informing forest policies and programmes.

Table 3.33: Perception on Livelihood Related to Natural Resources after Community Participation

	Project area with VDC				Project area without VDC				Non Project Area			
	Forested WS		Agrl. WS		Forested WS		Agrl. WS		Forested WS		Agrl. WS	
Perception	No.	%	No.	%	No.	%	N0.	%	No.	%	No.	%
Main Livelihood Related to Natural Resources After Community Participation												
Improved	60	25.7511	16	14.55	11	15.278	12	10.08	0	0	2	1.695
Significant Improved	19	8.15451	43	39.09	17	23.611	5	4.202	5	3.906	2	1.695
Not Improved	137	58.7983	39	35.45	24	33.333	73	61.34	93	72.66	87	73.73
Can't Say	17	7.29614	12	10.91	20	27.778	29	24.37	30	23.44	27	22.88
Total	233		110		72		119		128		118	
Change in Household Livelihood Strategy After Community Participation												
Yes	74	31.7597	18	16.36	30	41.667	25	21.01	2	1.563	2	1.695
No	144	61.8026	80	72.73	33	45.833	68	57.14	105	82.03	94	79.66
Uncertain	15	6.43777	12	10.91	9	12.5	26	21.85	21	16.41	22	18.64
Total	233		110		72		119		128		118	
Household Level Awareness of Participatory Process												
Yes	178	76.3948	75	68.18	44	61.111	58	48.74	8	6.25	14	11.76
No	36	15.4506	33	30	26	36.111	53	44.54	110	85.94	87	73.11
Uncertain	19	8.15451	2	1.818	2	2.7778	8	6.723	10	7.813	17	14.29
Total	233		110		72		119		128		119	

One-fourth of the respondents in forested watershed in project area with VDC perceived an improvement in livelihood related to natural resources after community participation, and 8 per cent perceived significant improvement in livelihood and 7 per cent were indifferent. Similarly, in agricultural watershed in project area with VDC, 39 per cent perceived significant improvement, 14 per cent perceived improvement and 35 per cent of the respondents perceive no improvement at all. It is to be noted that attempts has been made in non-project area also to involve local community in resource protection and conservation activities by forest department, which have improved the livelihood based on natural resources though modestly. Besides improvement in livelihood related to natural resource management, about one-third of the respondents in forested watershed in project area with VDC perceived a change in livelihood strategy after community participation, whereas, only 16 per cent perceived such change in agricultural watershed. In project area without VDC, 41 per cent and 21 per cent of the respondents respectively from forested and agricultural watersheds perceived a change in livelihood strategy (See table 3.33). In non-project area, as very little efforts, if any, have been made for community participation in natural

resource management, negligible change in livelihood strategy has been reported.

The respondent's perceptions regarding on-farm and off-farm income generating possibilities have also been ascertained. In project area with VDC, poultry rearing followed by animal husbandry and horticulture has been perceived as the high potential on-farm income generating activities in forested watershed. The animal husbandry and poultry rearing have been perceived as high potential income generating activities in agricultural watershed in project area with VDC and without VDC. In non-project area, horticulture has been perceived as more demanding on-farm income generating activity followed by animal husbandry and poultry rearing. The off-farm income generating possibilities in the selected sub-watersheds include construction, agricultural processing, silkworm rearing and handicrafts. The varying perceptions have been recorded across the project and non-project area on non-farm income generating possibilities. However, construction and silkworm rearing have been perceived as high potential non-farm income generating activities. It is significant to note that the villagers have very little skills and capital to venture into agricultural processing and handicrafts.

Conclusions

The agricultural intensification and diversification has occurred with project interventions consisting of technological transfers, access to agricultural extension services, improved access to local markets and subsidized agricultural input prices. After repairing irrigation drainage system, water harvesting structures and check dams, the conditions of the farmland have improved and the crop production has increased. The water resource was also enhanced by soil conservation, protection of green cover and reforestation, orchards, etc. The erosion control programme carried out by the project has reduced the erosion significantly. The vegetation has increased modestly and the forestland cover has also increased. Vegetation management practices included planting trees in the enclosed forestland, VCLs and private agricultural and community land. In most of the cases, only degraded natural forests have been handed over to the

user groups, as there is an informal rule within the IWDP (Hills-II) not to hand over well-stocked forests. Consequently, access to many community forests has been restricted temporarily in order to allow these forests to recover. As a result, many user group members have to rely on unprotected forest to meet their basic needs. In agricultural sub-watersheds in project area, there is severe fuel wood and fodder scarcity. Grazing cattle in community forest is either prohibited to defined periods during the year. As a result, people rely heavily on unprotected forests and VCLs for fodder, which further add to the forest degradation. Livestock composition has changed substantially, however, the number of crossbred cows increased, but other livestock fell in number. An increase in milk production and productivity has been reported in project area. The decline in the sheep population was particularly steep, which was due to the fact that mostly landless and marginal farmers were keeping sheep and goats, which had free access to common grazing lands and wastelands. As a result of the project intervention, grazing was stopped on VCLs under regeneration, reducing the grazing area and depleting the forage potential. In spite of a reduction in total area available for grazing, dry forage production increased significantly compared to the pre project phase. The increase in dry forage production is mainly due to reseeding of field funds and hill slopes with grasses and legumes, and regenerating old rootstocks on hill slopes. The average dry forage productivity went up during the post project phase.

The evidence on poverty alleviation effects is ambiguous: while all members of a user group benefit in the long run, the poor are more severely affected by restrictions on forest use in the short run. However, this is compensated by provisioning of wage employment on repair/construction activities on various project interventions. The creations of closures on VCLs and forestland have generated much needed wage employment though for a shorter duration. Furthermore, there is an equity problem between members and non-member of a user group. In the long run, every member of a forest user group benefits from project intervention in the form of closures on VCLs and forestland. However, in area where participatory institutions have not been created, the open access

forest would decrease further. Degraded VCLs and forestland, which are temporarily closed and effectively protected, will yield more forest-produce in the future. In this sense, community forestry leads to a Pareto improvement for the members of a user group. In the short run, however, the poor have to suffer the most as the VCLs and forestland has been closed temporarily. Opposition to VCLs and forest closures has been noticed during the field visits. On the other hand, the better-off factions of a user group, e.g. land owners with tree on their own lands, do not oppose community forestry because they have alternative to forest use. At the user groups level, the heterogeneity and fragility of land resources along with the variable rainfall made it difficult to fully harness the potential of CPRs and adequately meet the environmental risks through private resources based on crop farming alone. The balancing of intensive (by cropping) and extensive (by pasture forest) use of land, as required by the resource characteristics became a part of collective strategies for risk management and production enhancement.

CHAPTER IV

Participatory Approaches And Transaction Costs

The motivation for institutional change in use of natural resources has arisen from emerging resource scarcity and greater competition for rights of access and exploitation. In the context of watershed development and protection, institutional reforms were instituted under the Integrated Watershed Development Project (IWDP), Hills-I, Jammu and Kashmir in the early 1990s. The overuse and increasing scarcity of natural resources, and decline in traditional institutions to manage watershed resources including arable and non-arable lands, water resources etc. were the deriving force behind the recent institutional changes in watershed management in the rainfed areas of the Shivaliks. The institutional reforms had been extended vigorously by selecting four new sub-watersheds under IWDP, Hills-II, Jammu and Kashmir in early 2000. The agenda for reforms included: evolving cost-sharing mechanisms for resource development, protection and use; reform of regulatory agencies to act as facilitators in resource conservation; and involving users of watershed resources in the process of institutional reforms and in resource management. The underlying intent of the introduction of institutional reforms was to remove government subsidization of watershed development and protection programmes and management of resources, evolving cost-benefit sharing mechanism, specification of property rights (especially usufruct rights in natural resources) and duties, socially optimal allocation and use of resources etc. All these institutional reforms in the context of IWDP, Hills-II, Jammu and Kashmir are being implemented through people's participation in watershed development and protection. This would presumably result in a self-maintaining resource management system with minimal future government intervention in resource development and protection and ensures sustainability.

In the context of natural resource management, the government agencies evolve the participatory approaches to overcome and minimize the transaction costs associated with project implementation. The operationalization of participatory

approach is not cost less and involves a logistical cost. At a higher scale of operation, the logistical costs of evolving participatory approaches eventually exceed the transaction costs they seek to avoid. However, the participatory approaches generally operated at a lower scale in more decentralized and democratic fashion and offer a better and more efficient alternative to top-down approach. Thus, participatory approach confers benefits above that which can be had from the government implementing agencies for a number of reasons. First, the community has the knowledge of the status of the resources to be managed and conserved and would help the project implementing agencies by transferring the necessary information. Otherwise, the government agencies have to invest heavily in collecting, assimilating and communicating masses of scattered information. Thus, decentralized decisions by the participatory approaches are more efficient in natural resource management. Second, the community institutions are participatory and decisions made are largely decentralized and democratic. Third, the people's institutions serve as a useful mechanism for equitable income redistribution. They help reduce the conflicts and improve the distribution of benefits from resource management and reduce a government's reliance on the redistributive mechanisms that suffer from "leaky bucket" phenomenon. Fourth, the participatory approaches are more flexible in working than its bureaucratic counterparts and are able to recognize the emergent needs of the members and communicate effectively with the other stakeholders. As a consequence, the participatory institutions are often in a better position to respond to the changing circumstances than the remote bureaucratic structures. Finally, the participatory institutions has an equitable benefit sharing mechanism, which greatly simplifies the resource use and highly conducive to natural resource management. Thus, the participatory approaches are more efficient than top-down approach in natural resource management. However, the participatory approaches' virtues depend almost entirely upon the formal and informal rules in use, and their monitoring and compliance. The well design development programme ensures widely acceptable regulations, better monitoring and compliance, which facilitates in lowering transaction costs. In the

present chapter, an attempt has been made to examine the role of user participation in lowering the transaction costs related to watershed development and protection; and to identify and estimate the actual costs incurred on institutional strengthening in sub-watersheds of Ramnagar and Akhnoor.

User Participation and Transaction Costs

Recent past has witnessed rapid change in policies to reduce rural poverty. Greater emphasis is now placed on participatory management of common property resources (CPRs). The participatory approaches emphasize local participation; support the construction of social capital and linking the poor to dynamic sectors of the economy. Participation allows the poor a voice. The transfer of responsibility gives them the power to discover and determine ways to improve their lives. Empowering the poor is the foundation of rural poverty alleviation. The rural poor depend heavily on CPRs to supplement their livelihood strategies, but income from CPRs is falling sharply as they are degraded. The livelihood of the rural poor depends on the success with which CPRs are managed, and on the environmental consequences of their management. Recent years have witnessed an increasing trend towards devolution of control over natural resources from government agencies to local communities. These resources include village common lands (VCLs), water (especially irrigation), and other common pool resources such as grazing lands, forests, fisheries and wildlife. Experience has shown that 'top-down' approach to resource management is effective only with large expenditure on monitoring and enforcement of regulations. Usually the non-poor evades top-down regulations, while the poor are effectively excluded from livelihoods without compensation. On the other hand, participatory approach has proved essential for effective and sustainable management and conservation of natural resources systems..

The participatory process has a much larger degree of participation by resource users and other interests. The participatory institutions ensure the active involvement of various stakeholders in resource management and are realized through decentralized initiative and control. It also facilitates their full participation

in designing rules, monitoring and enforcing the regulations. Through participatory institutions, the true nature of the problem, a wide variety of interests, and multiple socioeconomic objectives are perceived correctly. It facilitates in representing divergent interests to the external agencies in right perspective and collective manner. The participatory institutions are helpful in collective decision-making and implementation of resource management programmes. Three basic types of decisions related to resource management viz. conservation, regulation and allocation are effectively implemented through the participatory processes. The resource extraction is permissible to the level of sustainability. The regulation decisions are helpful in determining the level of use and extraction. Similarly, allocation decisions determine the division of the resource between various users. However, these decisions are supposed to change with the change in the status of resources. Despite their fundamentally distinct characteristics, conservation, regulation and allocation decisions are closely linked and giving rise to another problem of user participation. With the increase in the conservation needs, the restrictive regulations are required. The user participation will facilitate in framing suitable regulation for resource use under changed circumstances. The participatory institutions will further help in equity aspects of resource utilization. However, participatory resource management may also hamper the process of conservation and regulation decisions, if the allocation decisions are not conforming to conservation and regulation decisions. The participatory management may in such situations undermine the management process.

Individuals or groups innovate institutions in order to reduce the transaction costs. Institutions evolve or change when the expected benefits from such changes are greater than the costs involved in undertaking such activities. Thus, the transaction costs are the main force behind the institutional change. Similarly, efficient institutions replace the old and inefficient ones, if the net gains are positive. In the context of CPRs, collective action outcomes would be preferred when the expected returns are larger than the cost of coordinating participatory approach. It is not necessary that all existing institutions are efficient. Imperfect

information could block an appropriate institutional arrangement or could lead to degeneration of an appropriate institutional arrangement, particularly in watershed programmes where expected benefits are not known. Therefore, information is necessary but not sufficient condition to explain institutional change in the context of watershed management, where collective action is a prerequisite for institutional arrangements. The costs of obtaining such information are not large compared to collective economic benefits. However, other transaction costs such as the coordination of the group may be high. The coordinating costs act as disincentive for individual initiatives within the group and requires external forces.

Ostrom (1990) identifies a numbers of factors that contribute to long-enduring common property resources: clearly defined borders, congruence between rules and local conditions, representative and collective choice arrangement, agent to monitor use, the graduated application of sanctions, the availability of conflicts resolution mechanisms and reorganization of collective by government authorities. Yet, as she notes, long endurance does not imply that common property is being used efficiently. The user participation in resource management results in higher efficiency and affects the management costs. User participation contributes positively to the cost-effectiveness of watershed management when it lowers costs of information gathering, coordination, monitoring and enforcement. However, the positive contributions of the user groups in resource protection and conservation ultimately depend on resource conditions. If the resources are degraded, the participatory institutions must be evolved before resource conditions decline to the point of scarcity. One of the objectives of IWDP (Hills-II), Jammu and Kashmir is to put in place new institutional arrangements for effective, equitable and efficient management of watershed resources. Effective management of watershed resources is difficult because of the conflicts between short-term needs of the stakeholders and long-term objectives of resource sustainability. Individual resorts to use of natural resources without regard to collective benefits. Similarly, collective institutions may be developed in ignorance of the individual needs. Equitable management of watershed

resources is difficult to achieve, because of divergent interests and value involved. Due to existence of high transaction costs involved in gathering information, monitoring and enforcement, efficient management of watershed management is difficult to realize. However, in favourable and conducive situation, the benefits from resource management may exceed the management costs. The participatory approaches can play an important role in enhancing the outcomes of resource management by lowering the information, monitoring and enforcement costs. The participatory institutions also influence positively the equity and effectiveness of resource management. If the participatory approaches to resource management are fair and effective, the resource sustainability can be achieved, and otherwise, it will result will be overuse and degradation of resources. The cost-effectiveness of watershed management requires that participatory management must be efficient so that the objectives be realized with minimum costs as well as the benefits from resource management must be higher than the costs involved to operationalize the participatory approach.

Transaction costs of resource management result from the need to describe a resource, and to design, implement, monitor, and enforce a set of regulations. Some transaction costs remain fixed regardless of the type of the process used to make decisions such as the costs related to provision of scientific information. Other transaction costs vary with the process used to make decisions and the quality of data collected. Costs of information gathering, coordinating between user groups, and the programme implementation and enforcement can vary according to the quality of data and the process adopted. Four resource management stages in which variable transaction costs are incurred are the description of the resource context, regulatory design, implementation, and enforcement [Hanna (1995)]. The implementation of a resource management project requires information on description of resource users, processors, market, and the analysis of social and economic characteristics of all resource interests. The user's participation in information provisioning helps in arriving at accurate assessment of the problem. The project implementing agencies often lack the

trained personnel to collect such diverse data to support such assessments. The programme design phase of the project also requires information describing resource context, which reflects accurate assessment of social and economic conditions. Due to inaccurate assessment of resource context and social and economic environment, the implementation of a regulation failed to control user behaviour in economic, social, and cultural dimensions. Similarly, monitoring compliance with regulations will be excessively costly if the monitoring systems are not designed to be in consistent with resource dynamics or user operations. The same condition applies to the enforcement of regulations. Resource extraction activities often take place over a large geographical area, so the effective enforcement requires some degree of cooperation of those who are regulated. Regulation must also fit within the structure of operations.

Institutional Decisions and Transaction Costs

The transaction costs have been defined as 'costs of arranging a contract ex ante and monitoring and enforcing it ex post' [Hubbard (1997)]. Institutions also facilitate reduction of transaction costs. The well-defined property rights and supporting institutions reduce the transaction costs of negotiated decisions by reducing the amount of information that must be collected, by providing paradigms for negotiation, and by providing mechanisms for enforcing contracts. The resources are required for establishment and maintenance of property rights and institutions. Alternative institutional arrangements will differ with respect to (i) the transaction costs of decision-making and exchange to achieve particular objective with respect to resource allocation; and (ii) the costs of institutional establishment and maintenance. A new institutional structure will be of benefit to society where the reduction in transaction costs of allocation decision exceeds the costs of establishing and maintaining these institutions. The efficient set of institutions for governing a particular set of allocation decisions will be that which minimize the sum of transaction costs incurred in decision-making and in establishing and maintaining the institutions.

The top level of a property-right hierarchy for the resource must therefore be one either of open access, state property, or common property. The bottom level of any property-right hierarchy generally constitutes a private-property regime. In most cases of natural resources, it is ultimately individuals or private corporate entities that have a right to extract benefits from entitlements to resource use. This includes many resource situations described as common property. The choice between alternative property-right regimes can be considered as a problem of minimizing transaction costs associated with the making of decisions over the use of a resource. There are benefits to collective decision-making in regard to resource use [Bromley (1989); and Ostrom (1990)]. There are external costs and benefits to individual decisions that can be incorporated into collective decisions if the benefits of collective decisions exceed the additional costs of collective decision-making, and then the associated regime of collective property rights is more efficient than a regime of private property rights. In some circumstances, the costs of collective decision-making would exceed the benefits, resulting in private property and individual decision-making being the optimal property-right regime. If some form of collective action is an efficient means of management of the resource, then a choice still needs to be made between state property and common property. The choice can also be considered in terms of the benefits and costs of decision-making under each regime. The types, and hence benefits, of decisions made under each regime and the costs of decision-making may differ due to such factors as different information, different objectives and different decision-making procedures.

Ostrom (1990) lists several factors, which influence benefits and costs of decision-making under common-property regime. These include existence of supportive institutions from superordinate levels in institutional hierarchies, clear definition of rights to participate in decision-making, precedents of successful collective decision-making, and information about the state of the resource and the impacts of the resource. Similarly, there will be many factors, which influence the costs and benefits of decisions under state property, including the characteristics of the information available to decision-makers, the nature of

political decision-making processes, and the extent of rent seeking by officials of government agencies. All allocative decisions are not made at the top level of institutional hierarchy, because there are net benefits to be gained by retaining some allocative decisions at particular levels in a hierarchy and delegating power to make other allocative decisions to subordinate and decentralized entities. The potential for net benefits by doing so arise where there are multiple decisions that need to be made for use of a resource. Each type of decision is associated with particular information requirements and patterns of interests amongst individuals or groups in a society. Consequently, assigning powers to make particular decisions to different levels in an institutional hierarchy may minimize transaction costs in resource management.

Two major costs affect institutional choice: transformation costs, and monitoring and enforcement costs. If the expected costs of transforming the rules are higher than the net benefits to be gained, no further cost calculations will be made. Appropriators will retain their status quo rules that produce fewer benefits than would alternative rules, because the costs of changing the rules are higher than the benefits to be obtained. If the ex ante costs of transforming the rules are not too high, expected changes in ex post costs will also be evaluated including the effects of proposed rules on monitoring and enforcement costs.

Transformation Costs

Transformation costs are the resources devoted to the process of considering a rule change. The number of individuals involved in institutional change, the heterogeneity of interests, and the size of the group minimally necessary to achieve a change in status quo rules influence transformation costs positively. Transformation costs are lower when skillful leaders are involved. The total transformation costs is not affected by the presence of individuals who have substantial assets at stake. However, the presence of individuals who will derive substantial benefits from a change in rules influenced the transformation costs positively. The type of proposed rule also affects transformation costs. If the expected benefits from the proposed rules are high and the transformation costs

are low, these are likely to be adopted before rules with high transformation costs. Over the period, the resource users can gain experience concerning the costs of changing the rules in their setting before attempting changes that will require substantial transformation costs. If the transformation costs for changing some rules are low enough, one or two individuals may receive sufficiently high benefits from the change to pay the entire costs themselves. The sharing of norms concerning resource use will affect transformation costs directly and indirectly. The transformation costs are high when individuals adopt confrontational strategies [Scharpf (1989)]. The appropriators who share norms that restrain opportunistic behavior can adopt rules that are less costly to operate than are the rules adopted by appropriators who do not share such norms. The rules instituted at one time will also affect the transformation costs at a later time. The level of autonomy to change their own rules will also affect the transformation costs. Considerable time and investment is required to change rules set by top-down approach. Time is spent in explaining the problem and change required consulting and motivating the stakeholders to forestall their opposition [Wade (1988)].

Monitoring and Enforcement Costs

The costs of monitoring and enforcing the new rules under participatory approach are minimal than top-down approach. The users themselves frequently undertake monitoring activities, while attending their normal activities or on rotational basis. The substantial costs are involved in enforcement of rules. The physical attributes of the resources and the proposed rules affects the monitoring costs. The primary cost of exclusion may then be the legal action required stopping an unauthorized user from continuing to use a resource. The close proximity to the resource and the users tend to lower monitoring and enforcement costs. Alternatively, if appropriation of resources is visible and open for casual inspection, monitoring costs will be low. The shared norm adopted for appropriation will lower monitoring a particular resource. If the shared norms are legitimate and followed will reduce the monitoring costs, and their absence will

increase the costs of monitoring. The regular dissemination of information about regulated activities will also decrease monitoring costs. Rules themselves vary in terms of monitoring and enforcement costs. The more frequent the required monitoring, the greater the resources devoted to measurement [Ostrom (1990)]. Rules specifying the opening and closing dates of seasons are less costly to monitor than the rules specify a quota for resource use. Anyone found appropriating from the resource before or after the specified time is unambiguously breaking the rules. Rules that bring together the intruder and the looser are also easier to monitor than the rules that depend on accidental discovery of a rule breaker by someone who may be indirectly harmed by the infraction. Rules that place limit on the quantity of resource units that can be produced during an entire season or year are more costly to enforce. The use of quota will also depend on regularity of the flow. Besides physical attribute of the resource and the specific rules contemplated, monitoring and enforcement cost is affected by the authorities' recognition of the legitimacy of local rules. In areas, where government fails to recognize the user rights developed by local appropriators, exclusion costs can become very high.

Together, the various types of transaction cost will cause allocation decisions to be 'sub-optimal' relative to those decisions that would be made in the absence of transaction costs. Estimating the extent of sub-optimality for the use as a measure of transaction costs may, in principle at least, be achieved through estimating various transaction costs and transaction costs functions and incorporating these costs into models of allocation decisions. Estimating the transaction costs functions is likely to be a difficult step in this approach as there has only been very limited empirical work undertaken on transaction costs of allocation decisions and the relationships of these costs with institutional structures and other parameters of system of resource use. Ostrom (1990) indirectly examined costs of decision making for resource allocation in an assessment of common-property institutions when she investigated the 'success' of common-property arrangements in developing and implementing allocation rules for common-pool resources. Transaction costs were not quantified, but

strong correlation were shown to exist between factors presumed to affect the costs of decision-making and enforcement, and the difficulties experienced by common-property groups in implementing allocation rules.

Quantification of Transaction Costs

The main problem with transaction costs approach is their quantification. Quantitative estimation of transaction costs in government decision making for allocations of natural resources are rare. There is general lack of established techniques for empirical estimation of the types of transaction costs associated with decision making for resource allocation. Unless these costs are measured, there is no way this approach can be tested empirically. Transaction costs are often taken into account without any quantification and their existence is considered as a theoretical possibility. In the following paragraphs, an attempt has been made to identify and estimate the actual costs incurred in specific situations rather than estimating 'transaction-cost functions'. The transaction costs involved in operationalizing participatory approaches in the context of watershed management have been identified with the help of participatory rural appraisal (PRA) exercises and focus group discussions held with the staff of the project implementing agency (PIA) and the members of village development committees (VDCs). On the basis of the published studies, it thus appears that there is a general lack of established techniques for empirical estimation of the types of transaction costs associated with decision making for resource allocation. Some efforts have been made to estimate static transaction costs both ex post and ex ante for alternative institutional structures. However, in the present study, attempts have also been made to estimate the actual costs incurred on institutional strengthening in the selected sub-watersheds.

PRAs reveal that the project implementation agency has borne the costs related to institutional change to evolve the participatory approaches in resource management under IWDP (Hiils-II), Jammu and Kashmir. The major coordinating costs incurred by the project-implementing agency are:

Data collection and analysis especially Retrospective Study, Prospective Study, Shivalik Development Strategy, Benefit and Cost Sharing Study, Tribal Development Plan, Project Implementation Plan, Study on Income Generating Activities, and Willingness to Pay and Social Development Study.

Information dissemination and communication through Participatory social development exercises, PRAs and motivational campaigns;

Design and implementation of regulations including cost-sharing mechanism, benefit-sharing mechanism, bye-laws for VDCs, SHGs, user groups etc.;

Development of village development plan (VDP);

Capacity building of various stakeholders including project staff by hiring of expertise (NGOs/training institutes) on various aspects of participatory watershed development, deputing the project staff outside the state to upgrade the participatory development skills, exposure visits of members of VDCs, SHGs, user groups, farmer groups outside the state;

Financial contribution towards VDCs, SHGs, user groups strengthening;

Transportation and logistic costs involve in institutional change;

Training costs on income generating activities;

Conflict resolution and/or negotiations; and

Monitoring and evaluation through internal monitoring and external idependent monitoring and evaluation.

The individual resource users have incurred considerable costs in evolving participatory approaches in watershed management, which includes:

Cost of work time lost to attending meetings to supply information, coordinate the users, devise rules, preparing village development plan (VDP);

Time devoted to acquire information and communicate with others;

Direct monetary expenditure for information, travel and communication;

Monitoring the behaviour of other users and outsiders; and

Resolving conflicts and/or negotiations.

Table 4.1: Transaction Costs on Institutional Strengthening in Sample Sub-Watersheds (in Rs. lacs)											
										Ramnagar	Akhnoor
		1999-2000				2001-2002				Change	Change
		Ramnagar		Akhnoor		Ramnagar		Akhnoor		1999-2000 to 2001-2002	1999-2000 t0 2001-2002
Components of Institutional Strengthening	Unit	Fin.	%	Fin.	%	Fin.	%	Fin.	%	Fin.%	Fin.%
Capacity Building	Rs.	2.3	0.44	4.1	0.96	8.73	1.51	12.17	1.81	279.56	196.83
Policy Reforms & HRD	Rs.	0.1	0.019	1.0	0.23	0	0	0	0	-100	-100
Project Coordination & Support	Rs.	12.0	2.32	9.2	2.15	11.97	2.07	12.82	1.91	-0.25	39.34
Information Management & ME	Rs.	2.3	0.44	2.25	0.53	4.0	0.70	1.7	0.25	73.91	-24.44
Total Project Expenditure	Rs.	517.7		428.7		578.19		671.44		11.68	56.62

Source: Physical and Financial Achievements, 1999-2000 and 2001-2002, Integrated Watershed Development Project (IWDP), Hills-II, Jammu and Kashmir.

The data presented in table 4.1 reflect the transaction costs incurred on institutional strengthening by the project in the sample sub-watersheds of Ramnagar and Akhnoor. The main components of institutional strengthening are capacity building, policy reforms and human resource development, project coordination and support, and information management and monitoring and evaluation. In 1999-2000, a total capital of Rs. 517.7 lacs and Rs. 428.7 lacs has been spent on various project components respectively in the sub-watersheds of Ramnagar and Akhnoor, out of which Rs. 16.7 lacs and Rs. 16.55 lacs has been spent on institutional strengthening. Thus, the transaction costs incurred on institutional strengthening are very small and work out to be 3.22 per cent and 3.86 per cent respectively in sub-watersheds of Ramngar and Akhnoor during 1999-2000. The proportion of transaction costs incurred in the year 2001-2002 has increased to 4.27 per cent in Ramnagar and declined to 3.83 per cent in Akhnoor. Two important transaction costs incurred on institutional strengthening are project coordination and support, and capacity building of beneficiaries and participatory planning staff. The transaction costs on project coordination and support includes travel and logistical costs, hiring of consultants, equipment and supplies and wages to participatory social development functionaries. In 1999-2000, a sum of Rs. 12.00 lacs and Rs. 9.20 lacs have been spent on project coordination and support in Ramnagar and Akhnoor respectively, whereas Rs. 11.97 lacs and Rs. 12.82 lacs respectively h0ve been spent in Ramnagar and

Akhnoor on project coordination and support in 2001-2002. Out of total project expenditure, the transaction costs incurred on project coordination and support stood at 2.32 per cent and 2.15 per cent respectively in Ramnagar and Akhnoor in 1999-2000 and 2.07 per cent and 1.91 per cent in 2001-2002.

The transaction costs incurred on capacity building of beneficiaries and participatory development staff includes hiring of NGOs services, participatory development coordinators, participatory facilitators at sub-watershed level, and participatory development motivators at village level. Some consensus building/review workshops, participatory assessment planning exercises, training on participatory watershed management, and income generating activities has also been conducted at sub-watershed and village level. In 1999-2000, a sum of Rs. 2.3 lacs and Rs. 4.1 lacs have been spent on capacity building of beneficiaries and participatory project staff in Ramnagar and Akhnoor respectively, which increased to Rs. 8.73 lacs and Rs. 12.17 lacs respectively in 2001-2002. Out of total project expenditure, the transaction costs incurred on capacity building stood at 0.44 per cent and 0.96 per cent respectively in Ramnagar and Akhnoor in 1999-2000 and 1.51 per cent and 1.81 per cent in 2001-2002. It is significant to note that transaction costs incurred on capacity building increased considerably between 1999-2000 and 2001-2002 and recorded at 279.56 percent and 196.83 per cent respectively in Ramnagar and Akhnoor. In the selected sub-watersheds, the project has incurred transaction costs on policy reforms and human resource development only in the initial year, which is also negligible. However, it is pertinent to note that the project has invested a very large sum on data collection and information gathering, particularly in making arrangements for carrying out a number of studies related to policy reforms, which is not reflected in transaction costs incurred on policy reforms at sub-watershed level.

Besides above, the transaction costs incurred on institutional strengthening also includes costs on information management and monitoring and evaluation by the project staff. The project has incurred transaction costs on hiring of information technology consultants, GIS experts, exposure visits, silt observation posts, and

internal monitoring and evaluation system. In 1999-2000, a sum of Rs. 2.3 lacs and Rs. 2.5 lacs have been spent on information and management, and monitoring and evaluation in Ramnagar and Akhnoor respectively, which increased to Rs. 4.0 lacs in 2001-2002 in Ramnagar and declined to Rs. 1.7 lacs in Akhnoor in 2001-2002. Out of total project expenditure, the transaction costs incurred on information and management, and monitoring and evaluation stood at 0.44 per cent and 0.53 per cent respectively in Ramnagar and Akhnoor in 1999-2000 and 0.70 per cent and 0.25 per cent in 2001-2002. Thus, an increase in information and management, and monitoring and evaluation costs to the tune of 74 per cent has been recorded in Ramnagar and a decrease of 24 per cent has been noticed in Akhnoor. It is to be noted that there is in built monitoring and evaluation wing in watershed planning and implementation office of the project. The regular monitoring and evaluation is being carried and results are reflected in monthly, quarterly, half-yearly and periodical review reports. However, the focus group discussions held with the project functionaries revealed that the internal monitoring and evaluation was restricted to the component of watershed and protection and very little monitoring and evaluation cost has been incurred on participatory watershed development.

In the Shivalik hills, the main reason for the degradation of the CPRs has been the erosion of traditional common property institutions, which occurred as a result of demographic and technological changes. The strategy of the donors has been to revive the traditional institutions through project interventions at the village level, and by supporting a favourable institutional environment by providing technical and financial assistance to the project-implementing agency. PRAs reveals that transaction costs were relatively low in the project area where participatory approaches have been evolved in watershed management. This has resulted in stability of the institutions created and higher outcome in terms of environment and economic impact than the project area where institutional arrangement have not been put in place. The stability of the outcomes implies low transaction costs, because participants comply with new rules in place. Transaction costs rise when compliance is low or declines over time or when

rules are frequently changed. Alternations in rules cause transaction costs because they need to be negotiated and agreed upon. To begin with, new rules have been framed for resource use, which ensures incentives for rules compliance and the monitoring and enforcement costs were low. Under regulated CPRs, a set of rules has been instituted, which limit both accesses to the resource system and extraction of resource units. The rules were designed, enacted, and enforced by the users, who jointly own the resource. The project has facilitated in framing regulations. There were provisions for incentives for all participants in resource monitoring. The provision of incentives facilitates the individual resource users to adhere to commitments. Three factors can support the stability of an institution [Ostrom (1990]. First, each actor has to make a commitment to comply with the rules, which has to be credible in the eyes of all other actors. This is generally difficulty to achieve because incentives to defect are always present. Second, monitoring and enforcement mechanisms are required. Monitoring mechanism help to detect violators while enforcement mechanisms raise the cost violators have to incur for their infringements. The existence of these mechanisms works as an additional incentive to make a commitment. Third, external factors (i.e. the legal and political environment) can support or erode the stability of an institution. PRAs reveal that the participatory institutions have shown a high degree of stability in forested watershed than agricultural watersheds. The users groups have protected their CPRs after the transfer of the formal property rights. The rules concerning the resource use have seldom been altered and compliance has been high. The reason is that the groups were able to solve the problems of credible commitment, monitoring and enforcement. Further, the external environment played a supportive role. All these have resulted in minimization of monitoring and enforcement costs.

Under IWDP (Hills-II), Jammu and Kashmir participatory watershed management has been opeartionalized by forming Village Development Committee (VDC) and user groups. The social development functionaries along with members of VDCs and user groups have drafted the regulations, which defines membership, the organizational structure, the objectives of the groups, and the distribution of

usufructs among the members. It contains a list of members and executives who perform the day to day management functions. The regulations have been prepared in consultation with the members of the VDCs and user groups and enacted with by the consent of all the members and has been approved by the project authorities. After the enactment, the user group has applied it to manage the enclosed and protected VCLs and forests as community resources. The members of VDCs and user groups with active support and participation of the project functionaries at sub-watershed level have also formulated Village Development Plans (VDPs). The VDP includes the activities to be implemented, the locational pattern, and the patterns of usufruct sharing and protection. The regulations as well as the VDP conform to the project objectives. Some of the major activities and area of operation remains with project administration. It has been reported that VDP has been prepared but not includes the priorities of all the section of population inhabiting the sub-watersheds. The project has dominating negotiating power, as the user groups are not in a position to exert strong pressure on the project authorities. After the approval of VDP, the protected and enclosed CPRs are handed over to the user groups. Thus, the property rights concerning the regulated CPRs included in VDP are transferred to user groups. There is provision of withdrawal of property rights by the project authorities if the rules of VDP are not strictly adhered to. However, no such incidence of withdrawal of property rights has been reported from any of the VDC visited.

The observance of high stability implies that the problem of creditable commitment has been solved. The user groups have been built on existing power structures in the villages. VDCs and users groups formed by the project have a clear structure of authority. The participation in decision-making is limited. Village leaders who usually belong to the non-poor section of rural society are on the executives of the VDCs and users groups and determine the rules for the user group together with the project functionaries at sub-watershed level. However, representation has been given to the women, landless and disadvantaged groups on these groups. VDCs as well as user groups have not been elected in

any sense, rather selected and/or nominated by the influential village leaders or by the project functionaries. However, the women participation in these committees is reportedly negligible. This particularly reflects the fact that the traditional class and gender hierarchy has a high legitimacy in the villages. Furthermore, the poor depend on the non-poor for a variety of reasons other than CPRs, which inhibits the poor from articulating their demands too strongly. Income inequality does not appear to be a hindrance to the stability of participatory institutions. It has been reported that the poor users comply with the rules in force. Furthermore, the intensity of conflicts over the protection rules for regulated CPRs is reduced by the fact that unprotected CPRs are available for use as open access, mostly in forested sub-watersheds. The poor villagers switch to these open access and unprotected CPRs for meeting their needs. The existence of alternative sources of CPRs to the resource poor users has facilitated the implementation of strong protection rules. However, availability of open access and unprotected CPRs has resulted in overuse and degradation of these unprotected resources. The non-poor, on the other hand, can resort to meeting their needs from their own lands. The population composition of the sub-watersheds has little influence on the user group stability. Ethnic groups like scheduled castes, scheduled tribes, pastoral transhumance communities and general social groups like the Hindu castes, Muslims castes, etc inhabit the sub-watershed. Further, spatial distribution of CPRs in the villages has not been an obstacle to creditable commitment because only villages located adjacent to a common resource has formed groups. As these groups are able to effectively exclude outsiders, the resource demands from the non-local users do not threaten user group stability. They rather reinforce stability, as non-local villagers who “encroach” on the user group’s resources are considered as common enemies.

Effective monitoring and enforcement exists in all user groups visited. The user groups build on the existing power structure and the monitoring and enforcement costs are low. Graduated sanctions are virtually non-existent. Monitoring and enforcement systems differ between the user groups. The regular project

employees attend the watch and ward of the enclosed forests. However, they are mostly local resident. In most of the cases, user groups' members also attend to the watch and ward activities and monitor each other behaviour permanently. The project authorities back enforcement of the rules. In the project area with VDC, no incidence of theft, intrusion, and violation of the rules have been reported. Actually, the nearby unprotected and open access CPRs met most of the resource needs of the members and non-members as well as poor and non-poor, which facilitate in strong monitoring and effective enforcement of the rules. IWDP (Hills-II), Jammu and Kashmir has been broadly supportive of participatory management. The project has created participatory institutions and assists the groups at every step in opearionalizing the participatory approach to watershed development and protection. The funding agencies have emphasized on evolving the people's institutions through the institutional reforms. All the project interventions are being implemented with active participation of the local stakeholders. The project has initiated the capacity building exercises by involving local NGOs and outside professionals. The exposure visits have also been organized for the members and executives of the user groups. However, no attempt has been made to register the user groups either by the members themselves or by the project functionaries. In many VDCs and user groups, the property rights to manage the protected and regulated CPRs have not been transferred to the resource users. Wherever, property rights have been transferred, the resource users complained the delay in transfer and/or ineffective transfer. Some of the functionaries of the project at village level have reportedly created hurdles in transferring the property rights due to vested interests.

Transition Costs

Transition costs are those costs that are expended to bring the institutions into being and to maintain them. The distinguishing feature of transition costs is that the costs would not be incurred in the absence of a change in circumstances, and the costs will not recur after the transition to a new set of circumstances is

complete. The types and magnitude of transition costs is determined by the nature of the institutional change as well as the institutional status quo. The project-implementing agency has incurred substantial transition costs in establishment of VDC and its maintenance. The main transition costs incurred for the establishment of VDC have been reportedly the costs of information gathering, information dissemination and communication, institutional design, negotiation, bargaining and decision-making and institutions creation. Likewise the transition costs incurred by the project implementing agency on maintenance of VDC includes costs of establishing regulations, capacity building, lobbying with interest groups, financial contribution towards VDC funds capitalization, transportation and logistic arrangement and monitoring and evaluation. A perusal of data presented in table 4.2 makes it evident that the transition costs incurred on establishment of VDC have been reportedly more than transition costs incurred on maintenance of VDC. The participatory institutions require more transition costs for its creation than its maintenance on the part of project implementing agency, as most of the costs of institutional maintenance are borne by the participants themselves. The table 4.2 also makes it clear that the transition costs of establishment of VDC and its maintenance was comparatively more in forested watershed than agricultural watershed; which was due to the fact the costs of information collection, dissemination and communication, capacity building and transport and logistics are comparatively high in forested watershed then agricultural watershed. The overall mean values of transition costs on establishment of institution and its maintenance is estimated at Rs. 124.5 and Rs. 10 per beneficiary.

Table 4.2: Transition Costs Incurred by the Project Implementing Agency (Rs.)

Transition Costs	Project Area With VDC			
	Forested Watershed	Agricultural Watershed	Total	Average
Establishment of VDC				
Information Gathering	28	23	51	25.5
Information Dissemination and Communication	32	26	58	29
Institutional Design	23	18	41	20.5
Negotiation, Bargaining & Decision-Making	26	22	48	24

Institutional Creation	28	23	51	25.5
Total	137	112	249	124.5
Maintenance of VDC				
Establishing Regulation	16	13	29	14.5
Capacity Building	17	13	30	15
Cost of Lobbing with Interest Groups	19	16	35	17.5
Financial Contribution towards VDC	22	17	39	19.5
Transportation and Logistics	27	21	48	24
Monitoring and Evaluation	12	9	21	10.5
Total	113	89	202	101

Static Transaction Costs

Static transaction costs are the costs of making decisions for resources allocation within a given institutional structure. Static transaction costs arise through costs of administering an institutional structure, and the costs of decision-making for resource allocation under that structure. In the present context, costs of administering VDC arise through the use of resources in maintaining and administering VDCs such as establishing ownership rights, protecting ownership rights and monitoring and enforcement. The costs of decision-making for resources allocation within a VDC or user groups arise largely through costs involved in identifying potential resources users, developing contracts and monitoring contract outcomes. The estimates of static transaction costs is given in table 4.3, which makes it clear that the costs incurred on decision-making for resource allocation was comparatively higher than costs incurred on administering VDC. The creation of VDC structure on the existing local institutions have facilitated in bringing down the cost of administering VDCs. However, the idea of participatory approaches in resource management is new to the members of user groups, which resulted in high costs on information gathering, identification of users, designing regulations for resource use and monitoring the outcomes of resources allocation.

New institutional arrangement involves the transaction costs of decision-making and exchange to achieve a particular objective with respect to resource allocation; and the costs of institutional establishment and maintenance. A new institutional structure will be of benefit to society where the reduction in

transaction costs of allocation decision exceeds the costs of establishing and maintaining these institutions. Thus, the efficient set of institutions for governing a particular set of resource allocation decisions will be that which minimizes the sum of transaction costs incurred in making the decisions and in establishing and maintaining the institutions. In the present context, this goal has been realized and cost-effectiveness in institutional efficiency has been achieved, which is clear from the data presented in tables 4.2 and 4.3. For instance, the average transaction costs incurred on decision-making for resource allocation has been estimated as Rs. 75.5 (see table 4.3), whereas the average transaction costs incurred on establishment of institutional structure and its maintenance has been estimated as 225.5 (see table 4.2). Thus, the gap between the average transaction costs incurred on decision-making for resource allocation and establishment and maintenance of new institutional arrangements has been very high i.e. Rs. 150. On the other hand, under top-down approach to resource management, allocation decisions are made unilaterally by central agency. The extent to which the resource would be allocated to its highest-valued use would be constrained by transaction costs arising from restriction on the availability and processing of information; problems and costs of monitoring and information collection; and the lack of general consensus to be achieved in allocative decision. Thus, the high transaction costs may result in administrative failure. It is significant to note that project-implementing agency has not incurred any cost on conflict resolution/negotiation. This is due to the fact that with the operationalization of participatory approaches through new institutional arrangements in the form of VDC/user groups for resource management, such costs if any were borne by the beneficiaries themselves.

Table 4.3: Static Transaction Costs Incurred by Project Implementation Agency (Rs.)

Static Transaction Costs	Project Area With VDC			
	Forested Watershed	Agricultural Watershed	Total	Average
Administering VDCs Structure				
Establishing Ownership Rights	13	8	21	10.5
Protecting Ownership Rights	11	16	27	13.5
Monitoring and Enforcement	18	12	30	15

Total	42	36	78	39
Decision Making for Resource Allocation				
Obtaining Information	29	27	26	28
Identifying Potential Users	18	16	34	17
Developing Contracts	17	19	36	18
Monitoring Outcomes	14	11	25	12.5
Total	78	73	151	75.5

Ex-Ante and Ex-Post Transaction Costs

The transaction costs of resource management are affected by process through which the user participation is structured. Management costs are incurred in four stages: two ex ante stages (description of the resource context and programme design) and two ex post stages (programme implementation and programme enforcement). A participatory process is associated with high ex ante and low ex post transaction costs. The participatory process generates social and economic information of high quality and quantity through a combination of project staff, secondary data and local stakeholders including the resource users. The user's participation in technical aspects of the project involves greater amount of time and money spent in coordination and information dissemination. Thus, participatory approach is costly approach in establishing the resource context. The participatory approach involves higher levels of ex ante transaction costs due to involvement of more experts into design and includes the resource users as co-designers. In heterogeneous groups, effective programme design requires investment in human capital, which are time consuming, and coordination and organizational costs correspondingly very high. The participatory approach ensures interactions among users and between users and implementing agency and it often is conflict-ridden leads to high cost of programme development. Thus, participatory approach is costly in the description of the resource context and programme design.

Table 4.4: Ex-ante and Ex-post Transaction Costs of Resource Management (Rs.)

	Project Area With VDC			
Transaction Costs	Forested Watershed	Agricultural Watershed	Total	Average
Ex- ante Transaction Costs				

Description of Resource Context	60	49	109	54.5
Programme Design	246	209	455	227.5
Total	306	258	564	282
Ex-post Transaction Costs				
Programme Implementation	150	124	274	137
Programme Enforcement	53	39	92	46
Total	203	163	366	183
Difference between Ex-ante and Ex-post Transaction Costs	103	95	198	99

In the implementation stage, the transaction costs involved are lower under participatory approach (see table 4.4). The difference between ex-ante and ex-post transaction costs is significant in both the forested and agricultural sub-watersheds and estimated on average at Rs. 99 per beneficiary. The local resource users with minimum costs do the monitoring of the programme implementation effectively and enforcement of the regulation compliance is also very high. The lower ex post transaction costs is realized through community participation in programme implementation, monitoring and enforcement of regulations. The user participation at the regulatory design and development stage creates a stake in the outcome and reduces uncertainty about process goals. User participation can promote stewardship through creating an assurance of control over outcomes. In brief, the benefits of participatory approaches are end-loaded, with the potential of long-lasting returns.

Under the new institutional arrangements, the individual resource users have incurred significant transaction costs, which are reflected in table 4.5. The data presented in table makes it evident that individual resource users have incurred a very high transaction cost on attending meeting followed by travel costs, which is estimated at Rs. 60 and Rs. 52 in forested and agricultural sub-watersheds respectively. On the whole, the transaction costs incurred by individual resource users were estimated significantly high in forested sub-watershed than agricultural sub-watershed. With new institutional arrangements, the individual resource users were also incurring transaction costs on monitoring and conflict resolution. In total, an individual resource user has borne Rs. 139 and Rs. 111 respectively in forested and agricultural sub-watersheds. It is noted that the total transaction costs incurred by the project implementing was higher, whereas the

average transaction costs was comparatively low in case of individual resource users.

Table 4.5: Transaction Cost Incurred by Individual Resource Users (Rs.)

Transaction Costs	Project Area with VDC			
	Forested Watershed	Agricultural Watershed	Total	Average
Attending Meeting	60	52	112	56
Travel Costs	32	17	49	24.5
Information Collection	14	12	26	13
Communication	17	14	31	15.5
Monitoring costs	9	7	16	8
Conflicts/Negotiation	7	9	16	8
Total	139	111	250	125

The benefits of participatory watershed management cannot be withheld from anyone, and also because of their size, most irrigation systems, forests, grazing lands, and other CPRs cannot be managed individually and require coordinated regulation. The coordinated actions are not cost less. The transaction costs are involved to coordinate individual's activities, to develop rules for resource use, to monitor compliance with the rules and sanctions against violators, and to mobilize the necessary cash, labour or material resources. Moreover, natural resources have multiple uses and users and are essential to the livelihoods of the poor. The top-down approach, which focus on resource management to maximize a single use, are not likely to be as appropriate in these situations as rules that are developed locally through negotiation between different users. The participatory approach can be instrumental in finding rules and allocation of the resource between different users in a way that is seen as equitable by the users themselves and help reduce transaction costs.

Water User Associations and Transaction Costs

Under IWDP, Hills-II, Jammu and Kashmir, a process of institutional change has been initiated with the objective of transferring control of the infrastructure for water use and distribution to the users. The field functionaries motivated the farmers for the formation of Water Users Associations (WUAs) with the idea to

capture economies of scale in the water diversion and distribution infrastructure, for which gravity-fed small water channels (khuls) have been constructed for diverting the stream water/rainwater to irrigate the agricultural fields. The economies of scale captured in the diversion of water to irrigate agricultural fields were necessary to enable provision of water at sufficiently low cost for use in irrigation, even though most irrigation development occurred within close proximity to the water stream and on the upper hill slopes. In the selected sub-watersheds, water diversion to group irrigation schemes involved government-funded drainage of upper hill slopes and construction of gravity-fed channels. The project provided finance and coordination of existing infrastructure repairs and development of new infrastructure for drainage and water delivery. With the development of group irrigation schemes, there was an associated demand for institutions for management of group infrastructure. It was considered that new management institutions (WUAs) would minimize the transaction costs of collective investment in infrastructure and subsequent management.

The establishment and maintenance of WUAs require development of institutional rules including those for general management; allocation of water to individual users; development, management and maintenance of infrastructure; provision of services of water supply; monitoring and enforcement to ensure compliance with group rules; and sharing of costs of these activities. The development of institutions for collective action poses a second-order dilemma with a lack of incentive for individuals to invest in the development of institutions that have characteristics of a public good amongst the participants within an irrigation scheme. Ostrom (1990) provided several examples of institutional innovation by groups sharing a water resource, which demonstrate that the development of institutions can involve high costs that may discourage voluntary supply of institutions. In the selected sub-watersheds, institutions of group irrigation (WUA) were developed and implemented prior to the repair of the existing infrastructure and development of new irrigation and water-distribution schemes. Thus, the development and implementation of new institutions was not

impeded by opposition arising from vested interested in a status quo institutional structure.

From a perspective of a transaction-cost analysis of institution supply, the supply of institutions for group irrigation schemes by the project represents a subsidy to the groups that reduces the transformation costs incurred by these groups in developing and enforcing institutions for collective action. The reliance on private investment for supply can greatly slow the rate of innovation in institutions as well as limit chances of success in-group cooperation [Ostrom (1990)]. The institutional innovation associated with the development of irrigation schemes was common property in water entitlements and irrigation infrastructure and a new form of private property in water: the entitlements held by individual farmer within the schemes. These new property rights were associated with new institutions of entitlements, allocation and re-allocation. The common property rights in the water entitlements of the WUA are either de jure or de facto. De jure rights existed where the management of the group held water entitlement given by the project functionaries. De facto rights existed where the management agency held decision-making power over the water through control of distribution infrastructure and rights to withhold supply to individual irrigators under certain circumstances such as inadequate water supply or failure to meet drainage requirements in water use.

The importance of transaction costs in institutional choice can be seen in terms of institutional innovations associated with group irrigation schemes. The primary incentive for the formation of WUAs is the economies of scale in provision of infrastructure for water diversion and distribution. In many cases, there was a demand for institutions granting property rights over water entitlements as well as the distribution infrastructure. Dahlman (1980) suggested that common property over grazing land was necessary to prevent individual grazers removing their ‘share’ of the land from the system of common usage and thus imposing costs on other grazers. The same rationale may provide motivation for group ownership of water entitlement, that is, an ability to use the powers pertaining to the common property right to control behaviour of individual user within an irrigation system,

and prevent individuals imposing costs on remaining users. This corresponds to a minimization of transaction costs in making and implementing collective decisions that are not always Pareto-efficient and may at times impose costs on individuals within the groups.

In case of WUAs, the project-implementing agency has borne comparatively less transaction costs. The transaction costs incurred on formation of WUAs includes the costs of establishment and maintenance of WUAs. The transaction costs of establishment of WUAs include the costs of gathering information, identifying potential users, development of institutional rules and cost of resource allocation. The transaction costs of development and maintenance of irrigation infrastructure includes the costs of administration of services of water supply; monitoring and enforcement to ensure compliance with group rules; and sharing of costs of these activities. The development of institutions for collective action is often confronted with a lack of incentive for individuals to invest in the development of institutions that have characteristics of a public good amongst the participants within an irrigation scheme. In the present context, the transition costs involved in establishment of WUAs and its operationalisation have been considerably minimized through participatory approaches. The project area is largely rain-fed which resulted in greater cooperation of the participants in creation of new institutional arrangements by supplying the relevant information, designing cost-effective water allocation rules and participatory rotational monitoring and strict enforcement of the rules in use. Besides, WUAs have been created prior to development of irrigation and water-distribution schemes. The members of WUAs have been actively engaged in the stage of development of irrigation infrastructure and water-distribution schemes. Thus, opposition arising from vested interests in status quo institutional structure did not impede the development and implementation of new institutional arrangements. From a perspective of a transaction analysis of institutional arrangements, the creation of WUAs by the project represent subsidy to the WUAs that reduced the transition costs incurred by these groups in developing and enforcing institutions for participatory irrigation management.

Table 4.6: WUAs and Transaction Costs Incurred by Project Implementing Agency (Rs.)				
	Project Area With VDC			
Transaction Costs	Forested Watershed	Agricultural Watershed	Total	Average
Establishment of WUAs				
Obtaining Information	13	9	22	11
Identifying Users	8	7	15	7.5
Development of Institutional Rules	6	8	14	7
Resources Allocation	9	7	16	8
Total	36	31	67	33.5
Development and Maintenance of Infrastructure				
Administration of Services	11	9	20	10
Monitoring and Enforcement	10	12	22	11
Total	21	21	42	21

The transaction costs incurred by project implementing agency on establishment of WUAs and development and maintenance of irrigation infrastructure is given in table 4.6. The data given in table 4.6 clearly reveals that the avearage transaction costs incurred on establishment of WUAs (Rs. 33.5) was comparatively high than the transaction costs incurred on development and maintenance of irrigation infrastructure (Rs. 21). Thus, the process of establishment of WUAs has contributed in minimizing transaction costs. Firstly, the existence of voluntarism for common cause in the selected sub-watersheds provided precedents for new institutional structures. The existence of institutional precedents has been demonstrated in other studies to be highly important in reducing costs of institutional development and change [Ostrom (1990)]. Secondly, the establishment of the irrigation schemes by the VDC on contractual basis and later transfer of property right to a WUA allowed the institutions of collective action to be established by the project functionaries. As a consequence, the transformation costs of institutional development would have been far lower than they may have been if a collective of the members involved in the schemes had undertaken the development. Later development of irrigation schemes within organizational structures of common property occurred under similar principles of project providing institutional support for investment in infrastructure. The institutional support provided powers to users for developing infrastructure, such as powers to obtain easements for water conveyance, and

also the institutions for organizations of ownership and management. The project support in this manner constitutes a subsidization of the transformation costs of institutional development. Despite the potential to minimize transaction costs associated with institutional innovation, the development of irrigation schemes was organized as a mix of common property and state property. The problem of inadequate investment, if any, on the part of private individual in-group schemes was resolved by developing infrastructure through project investment. The transformation costs for development of the necessary institutions were minimized through the involvement of users in management decisions of the schemes.

The system of entitlements, allocation and re-allocation established for WUA and for the individual water users within the schemes were similar to the institutions for providing water rights to individual water users. These were entitlements in the form of input quotas defined in terms of land area. The choice of entitlement systems can be analyzed in terms of minimizing transaction costs, where these costs comprise the costs of determining and adjusting quotas, and the costs incurred in monitoring and enforcement. The use of input quotas can be interpreted as a response to the initial aims of allocation and the transaction costs of enforcement. A principal aim for initial allocation was establishing a fair division of water entitlements, where ‘fair’ related to providing sufficient water to individual users to generate a level of income that could support a farming family. Since income was related to the irrigated area of a farm rather than water use per se, it was easier (lower transaction cost) to establish a quota on irrigated land area rather than the volume of water. The cost-efficiency of input quotas was also contributed to by applying water at fixed time intervals. Input quotas could limit water use to the required degree of precision. Furthermore, areas of land irrigated can often be easier to monitor than volumes of water use particularly when the land use is of perennial crops such as orchards.

The project authorities through changes in regulations predominantly undertook the supply of institutions for entitlement systems. The ability of the project functionaries to make unilateral decisions for institutional change has contributed

to low transformation costs. The transformation costs associated with the transfer of property rights from government to users appear to have been small and the process of institutional change was relatively quickly achieved. The ease of institutional change was due to transformation costs being met by the project rather than by users. The political costs associated with the institutional changes were also low. Many irrigators perceived prospects of financial gains through the transfers of property rights and protection against prospective losses as project has incurred expenses to improve irrigation infrastructure prior to and after transfer of property rights. The process of transfer of control of irrigation schemes to users has not been completed. Nevertheless, the process of transferring property rights from the state to WUAs is likely to continue. Thus, demand for institutional change is associated with willingness to pay to reduce transaction costs associated with achieving particular economic objectives, in this case objectives relating to the allocation of water resources. The supply of new institutions is limited by transaction costs arising in the costs of transformation from one institutional structure to another. The changes in the institutions of water allocation have been incremental, making changes at the margin to an existing institutional structure.

Before IWDP, Hills-II, Jammu and Kashmir, property rights to irrigation water in the selected sub-watersheds resided largely with government. The government maintained control over access of individual users to water, the land areas to which water could be applied, and the quantities of water that could be used. Since the operationalization of IWDP, Hills-II, Jammu and Kashmir, there has been transfer of property rights from the government to WUA that have taken over management of the distribution infrastructure. The principal changes in property rights and associated institutions have been as follows: enhanced security of water supplies; transferability of water entitlements; more detailed specification of rights and duties; description of opportunities and constraints pertaining to water transfer; and increased management flexibility in relation to water use. These institutional reforms have substantially strengthened the private property rights down the institutional hierarchy for water use. The transfer of

property rights down an institutional hierarchy can be difficult to reverse, because transformation costs of reversing the property rights at a later date are likely to be high.

The PRA exercises revealed that the benefits from participatory irrigation management are dependent upon the strength of property rights in an institutional structure. Under IWDP (Hills-II), Jammu and Kashmir institutional reforms have resulted in modification of property rights. However, the future benefits from participatory irrigation management would be maximized with greater role of WUAs in financial aspects by giving them the rights to collect water charges to be used for maintenance of the irrigation system. The net benefits of resource use to the society depend on both the benefits from irrigation and the cost of irrigation management incurred by the government in maintaining environmental quality. This cost is also influenced by institutional structure in place. With participatory approaches, the management costs are lower and benefits of resource use are maximized. The institutional reforms for water use can be considered as fairly cautious in so far as the government has retained substantial property rights over water, which has resulted in insecurity and uncertainty in water entitlements. There is need to precisely specify the water rights to the users. Security and reliability of supply are important for management decisions to ensure the continued viability of WUAs. Security of entitlement is also important for investment decision and to underpin a workable system of transferability.

Conditions for Minimization of Transaction Costs

The minimization of transaction costs through participatory approaches, however, depends on a number of conditions. Some of the key factors that may increase the likelihood of participatory watershed management and reduce the transaction costs are discussed below.

Size

User participation in resource management is a risky approach, if the short-term interests of the user groups will be more the long-term requirements of resource management. Olsen (1965) identifies two critical factors in the effectiveness of group action; the size of the group, and the use of the social and psychological incentives to augment economic incentives for the behaviour. Small groups tend to be more effective in encouraging the active participation of all members in effective management of the resource. Besides, the face to face interactions is also facilitated, which ensure effective use of social pressures and incentive to conserve and manage the resource. The small size of the group also ensures equitable sharing of benefits of resource management, which reduces the uncertainty and may lessen the urgency of individual inclinations to "free ride" by taking advantage of other actions [Runge (1984)]. Small groups have lower negotiation costs, are better able to recognize illegal users of CPRs, and are less prone to free riding by members. The participatory natural resource management projects have been successful in reducing conflict between group members through a conscious choice of more disadvantaged groups and areas and thus help minimize the costs involved in conflict resolution.

Group Homogeneity and Homogeneity of Interests

The user groups should always be homogeneous. This may be more important aspect of participatory management of CPRs than size, since how a community group of any size actually interrelates through institutional arrangements is more crucial to successful CPR management. The homogeneity of the groups is felt to be important in the development of successful institutions and helps in reducing transaction costs. Conflict of interests can also be reduced, if compensation is provided to overcome differential gains from cooperating. Poor users may be reliant on a resource for their very survival, but non-poor villagers may make large financial contributions to institutional costs and take up leadership gains from the CPRs management. This applies to irrigation schemes where non-poor farmers may require a larger share of available water to irrigate their larger

landholdings. However, even in such cases, the poor could benefit from the participatory management of CPRs, provided their bargaining skills are enhanced and coalition is fostered among the poor, which require capacity building of the poor in negotiating and bargaining skills. The grazing land management is another CPR that induces the non-poor to play an important part in participatory action. Since the non-poor often own more and larger animals, they are likely to take advantage to common land for grazing, while freeing up their own land for other productive uses. Here again, homogeneity of interest of the poor and non-poor could be promoted by building on the coalition of the poor. However, coalition building among the poor and the non-poor also involve the transaction costs.

Tradition of Trust

Confidence and trust among members of user groups are necessary for successful participatory resource management. It is possible to create trust where strong traditions of collective economic action did not previously exist. The preconditions were the granting of secure, long-term user rights and cooperation incentives in the form of substantially higher incomes. The users set up systems of equity in income and cost sharing, democratic rotation of leadership, and monitoring by group members, which themselves depended crucially on the acquisition of relevant knowledge by members. The costs and tangible benefits of participation have long been at the heart of the collective action debate. One aspect of participation that is often not recognized is that people often choose to participate in natural resources management because it offers them an opportunity to socialize and form stronger relationships. Such networks contribute to greater livelihood security, especially in situations of poverty and vulnerability, where mutual support among family neighbours and community becomes vital. Even landless households contribute labour to watershed management activities, in part to strengthen networks with landowners that might later offer employment or other help. Such social capital could be an important survival strategy of a poor household.

Clearly Defined Property Rights

The economics of institutions employs the term property rights in a general sense to define the rights of an actor to use valuable assets [Alchian (1965)]. The property rights of an actor are embodied both in formal rules and in social norms and customs, and their economic relevance depends on how well the rights are recognized and enforced by other members of society. The ability of actor to use valuable resources depend on external/exogenous control and internal/endogenous control. External control depends on the property rights of an actor or institutional environment-constitutions, statues, regulations, norms, enforcement, and sanction. Internal control is established by the actors themselves through various investments aimed at gaining control over scarce resources, involving monitoring, fencing, arranging watch and ward, etc. For local users to be willing to take on responsibility for watershed management, the rights and responsibilities must be transferred from the state to users. Again, the transfer of property rights and duties are not cost less. Property rights play a central role in the management of natural resources, conveying authority and shaping incentives for management. They give necessary authorization and control over the resource, and can enforce collective action.

Entitlement Systems

There are, of course, aspects of institutions for regulation of natural resource use other than the property rights held by different entities. These relate to the manner in which entitlements to the resource are defined and allocated to the holders of property rights. Allocations of a resource necessitate physical division of the resource between potential users. An entitlements system can be conceptualized as a quota system, which provides exclusive rights of access to a resource. An initial distribution of entitlements between competing parties can be by administrative decisions on the ‘first come first served’ rule. With changing economic and social circumstances for a group of resource users and changes in condition of the resource itself, social benefits may be gained by altering the

allocation of the resource amongst users within any particular level of property right hierarchy. It is, therefore, common for the specification of any allocation system to include procedures whereby resources entitlements may be redistributed. The procedures for altering allocations may be 'use it or lose it'. The provisioning of entitlement system for resource use requires transaction costs.

Problems of Equity

A participatory institution for natural resources management is not necessarily pro-poor. The participatory management of resources can lead to improvements in productivity and sustainability of the resource and makes a strong case for encouraging and strengthening local-level institutions for the management of local commons. Extreme diversity and inequality among the potential appropriators of a resource may inhibit cooperation and increase the transaction costs, whereas equality may promote it and reduce transaction costs. The greater equality of endowments among the resource is associated with a higher degree of rule compliance and good maintenance, which help in minimizing transaction costs. The relatively egalitarian structure of the community is an important factor in the farmers' willingness and ability to organize resource management projects. In general, however, the relationship between inequality and collective action is complex. There are distinct but opposite effects of inequality. Those who benefits most from collective action are more willing to bear the costs involved and thus to make collective action possible. But those likely to benefit least have little incentive to participate in the collective effort: free riding then may be the more lucrative option for them. Besides, the transaction and enforcement costs for some cooperative arrangements may rise with inequality.

Inclusively of Local Institutions

Dominant groups frequently exclude weaker categories of users in order to achieve efficient use of resources. Although participatory watershed development

projects have been aimed at women as primary users of the resources, most participatory institutions exhibit a virtual absence of women. Women are invisible farmers and their needs are less likely to be taken into account. The few women who are involved in user committees often participate because it is mandatory for the committee to include one or two women. As a result, women on such committees tend to have nominal rather than effective presence. To overcome these problem, watershed development projects has been encouraging women to take a greater interest in resource conservation, protection and maintenance. The projects have now adopted an approach of facilitating the emergence of women's self-help groups (SHGs). The women group members try to help men to organize activities for natural resources management, which facilitates in minimizing the transaction costs. Once this is achieved, women SHGs leave it up to the men, but they do have a representative in the decision-making group. Women directly bear the cost of poor participation in community institutions designed for natural resources management.

Conclusions

In the recent past, resource use entitlements were free and open to all on common property, which have resulted in severe resource degradation in the Shivaliks. This has necessitated immediate restoration of ecology and environmental protection of the watersheds in Shivaliks. Numerous schemes for development and protection of degraded watershed of Shivaliks have been in operation since the past more than five decades. However, the performance has not been encouraging, due to lower or virtually negligible participation of the local stakeholders in the process of development and consequently high transaction costs of implementation of top-down approach towards rural development. Keeping these in view, the institutional innovation has been operationalized by evolving participatory approaches in designing, planning, decision making, implementing, monitoring and evaluating the outcomes at every stage of watershed development and protection to minimize transaction costs. Project implementing agency and user groups have incurred various types of transaction costs in operationalizing participatory approaches. User groups have played a significant role in design and

implementation of project interventions. Being nearer to the resource and having a greater understanding of its importance, they have designed effieient rules. In addition, the rules have been effectively monitored and enforced, which leads to greater accountability. User participation has also helped the project-implementing agency to reduce the cost of delivering project interventions and monitoring the outcomes for sustainability. Besides, the active involvement of beneficiaries has lowered the informational costs associated with project interventions. The participatory watershed management has enabled the local community to take account of local costs (external costs) that are ignored in higher-level decisions. These local costs can be balanced against the incomes and overall livelihood impacts to get more balanced watershed management decisions. Further, such local management can be designed to link investment with returns: for instance, resource conservation and protection, and infrastructure maintenance with the returns from usufruct sharing. Such a link between investment and returns, secured by assured user rights, is likely to result in higher level of resource conservation and protection, and maintenance. But although there is the potential to lower the costs of implementing interventions, it does not necessarily follow that beneficiaries will always be the lowest cost providers. Many regulated access schemes cannot survive and finally fail. Most permissible use of watershed resources becomes less efficient when the costs of regulation are considered. Presently, decentralization and participatory approaches become an important theme in watershed management. Institutional change is not cost-less or instant. Institutions are important factors in watershed management, but the potential costs and time for institutional transformation, i.e. the transaction costs should be carefully considered.

CHAPTER - V

Recommendations

The millions of rural poor derived their livelihoods from the exploitation of natural resources, whether village common lands (VCLs), forestlands, grazing lands, cultivated land or water. During the recent past, there have been fundamental changes in the way resources and supporting services are managed and in the rights and responsibilities of the resource users. New goals have been espoused and new institutions have been formed to pursue these goals. IWDP (Hills-II), Jammu and Kashmir has recognized the need for institutional reforms to achieve project objectives and to ensure long-term sustainability of the project interventions. However, the institutional reforms are never straightforward. The explicit goal of the reform is to improve the productive potential of the watershed resources and ameliorate the livelihoods of the poverty-stricken people living in watersheds by making them partners in natural resource management. The decentralization and participatory watershed management implies that those at the top cede decision making power, and (if well conceived) financial control, to those lower down in the system. However, due to resistance from within the implementing agency, the change is never really operationalized. The user groups and their committees were created but, because they were not given adequate resources and effective decision-making power, they became moribund. The success of participatory approach hinges to a great extent on the capacity of the project functionaries to embrace the change and to alter its working practices. Even, before reform, it was lack of skills within the government sector, which resulted in poor management. The operationalization of participatory approach requires even greater skill levels than the previous systems. Due to inadequate training and experience in social development aspects, the participatory social development functionaries were unable to form effective and sustainable user groups. Likewise, the extension officers were unable to select appropriate sites and design and implement the project

interventions. These are critical issues, since once local field functionaries lose credibility with the villagers; it can be very difficult to recover it.

If the field functionaries are to be in a position to elicit and devise programmes, which are responsive to local needs, the skill upgrading and capacity building are also important. Demand articulation is not automatic as might be assumed. Significant local level capacity building needs to take place, usually through the formation of effective local resource "user groups", before needs can be expressed and subsequently prioritized and addressed. If decentralization within government is designed in large part to institutionalize responsiveness to local people's needs, this is the key issue. It is also one that is frequently ignored when plans are drawn up to institutionalize 'demand driven' development process. Many project functionaries, for instance, do not have the social skills required to group development. Overcoming such prejudices can be very time consuming, but is usually essential if progress is to be made. One of the motivations behind operationalizing participatory approaches has been a desire to reduce transaction costs. However, there is little evidence that costs have actually fallen. Indeed, reform has added to project costs, because the funding requirements for capacity building have increased. Thus, it is unreasonable to expect that institutional reforms should have proceeded without any setbacks. Numerous conflicts have been experienced at various levels, such as between individuals, between line departments, and between sub-sectors. Clear policy pronouncements from government, combined with bold and enforceable regulations about the limits to government involvement, are certainly a good starting point, if these conflicts are not to be fatal for the on-going reform. All these will help create 'a sense of mission and commitment' among the project staff, which is important for project performance. Besides, it will contribute to teamwork and inculcate problem-solving attitude as well as to greater coordination between policy and implementation.

Increasing pressure on CPRs together with misdirected government intervention have led to the demise of traditional institutions for management of CPRs in watershed context. However, a participatory approach evolved under IWDP

(Hills-II), Jammu and Kashmir has played a facilitating role in resurgence of local resource user groups. The future of sustainable resource management lies more with local people though issues of non-poor domination and resource conflict may still is problematic. It is doubtful whether the few such groups that do exist can continue to do so without substantial external support. At present, resource user groups have achieved a degree of success by monitoring and enforcing resource protection and conservation activities, and thus enhancing resource productivity in environmentally and institutionally sustainable ways. However, most efforts are small scale and heavily subsidized, raising doubts about whether they can be replicated by the project.

There are two distinct strategic tasks, which must be confronted by the government and donors wishing to evolve successful participatory approach.

They must stimulate wide-ranging interest in such approaches, through attracting political support and promoting and publicizing the results and lessons such initiatives.

They must stimulate processes of learning so that institutional configurations, procedures and practices can be adapted to varying contexts.

Specific areas requiring support by the government and donors include the following:

The project functionaries must be must be infused with a sense of mission and task-oriented. The recruitment, performance assessment and promotion must be redesigned to stimulate participatory approaches.

The procedures within the project for allocating funds and other types of support to farmers' organizations tend to be inflexible. They must be streamlined and made more capable of accommodating the diverse requirements of participatory approaches.

The necessary skills for participatory action must be introduced into project implementing agency. The key areas in which skills need to be developed are stakeholder analysis, needs assessment, management of project cycle and conflict resolution. The participatory action does not come automatically, and it must be negotiated and not imposed by the project-implementing agency.

Monitoring mechanisms for participatory approaches must be put in place at the outset and procedures agreed upon for introducing course correction as necessary.

The following suggestions should be taken into account while initiating and operationalising participatory process in watershed management:

The selection of communities to be involved in a participatory and integrated watershed management process entails a complex series of mediations among technical factors, policies, the administrative structure of the area and local power sharing,. The role of facilitation teams in this process should be one of diplomacy, tact and respect for local actor's criteria and priorities, without, however, neglecting the project's agenda. The staff responsible for these preliminary visits must make significant efforts to convey a clear and straightforward message about the project's goals and approaches and to understand people's reactions towards the project's proposal for participation.

In participatory and integrated watershed management, there should be a balance between comprehensiveness and specificity in the content of the initial appraisal. The exercise should be sufficiently open-ended to allow local people to review all the meaningful aspects of their situation, yet at the same time sufficiently focused on environmental issues to promote people's awareness of the links between practices in natural resource management and socio-economic conditions. The organization and timing of the initial appraisal exercise depend on a number of conditions, such as population size, settlement patterns and accessibility. The amount of time available with participating communities, according to the local agricultural calendar, should also be considered when planning an initial appraisal exercise.

In preparing a tentative work plan, community members face the challenge of putting into action the learning process that took place during the participatory rural appraisal exercise. To accomplish this task successfully, responsive attitudes, mutual trust and good facilitation skills are necessary. Since establishing the above conditions requires time, the results of initial participatory planning exercises are seldom completely sound. A more in-depth analysis of the

implication of the decisions made in the framework of the participatory planning meetings is necessary before implementation can begin.

A negotiation among the community's felt needs and needs as defined by outsiders (such as project managers, technicians, local politicians and policy-makers) takes place in participatory feasibility analysis, leading to a series of compromises acceptable to all the involved stakeholders. For this reason, participatory feasibility analysis is a less neutral stage of the participatory process than initial participatory appraisal and planning. In fact, it is at this stage that the project becomes a stakeholder in decision-making and that the process becomes truly participative. Participatory feasibility analysis is essential in increasing the projects and the community 's understanding of the pros and cons of the proposed activity and in determining which activity can be realistically implemented through collaborative action. Participatory feasibility analysis allows participants to become informed about the institutional assets and constraints, which may either positively or negatively affect the fulfillment of their needs. This awareness is an essential element of community empowerment. Technical consultations, potentially leading to organizational arrangements, with a variety of institutions active in the community or the project area/watershed at large are also highly instrumental in widening the array of different activities that can be implemented in the framework of the participatory process. In particular, activities outside the project's mandate and operational capabilities (such as health, education and infrastructure development activities) may become feasible when involving relevant line agencies and NGOs in the participatory process. This contributes to making participatory watershed management truly integrated and collaborative. Sound implementation agreements require time, patience, flexibility, diplomacy and a human touch, which lead to a more solid partnership among stakeholders and a smoother participatory implementation process.

Natural resource management that does not have a direct impact on income is seldom considered a priority for marginalized communities, such as those settled in upland areas. Environmental awareness and natural resource management skills can be improved only if a certain level of organizational capacity is reached

and if primary needs (income, water supply, education, communication services, etc.) are first satisfied to a reasonable extent.

There is no standard technical answer for the problems affecting upland farming systems, careful on-site testing should be carried out to assess how a given measure can cope with the local environmental, economic and social conditions. Attitudes and behaviour of local people towards the land (and towards other natural resources on which their livelihoods depend) cannot be considered independently from economic and political factors, such as insecure tenure arrangement, the local market and social marginality. Rural women play a pivotal role in the operation of indigenous farming systems. However, their participation in activities for increasing the efficiency and sustainability of local agricultural production is affected by their insufficient decision-making power within the household and the farm. Women's empowerment is thus an essential requisite of farming system improvement.

Initiatives in CPR management take a long time to produce a significant impact on the environment and the welfare of local communities. The participatory process could be highly instrumental in raising or renewing people's interest in their common property and in developing the necessary environmental management skills. However, participation is not enough. Technically sound and cost-effective solutions to CPR management problems, which take into account the environmental, economic and social aspects of implementation and maintenance, need to be identified and validated at the local level. Rural women play a pivotal role in CPR management, which is, however, often overlooked because of the gender roles and the power structure prevailing in the community. Thus, no participatory initiative aimed at improving the sustainable use of fuel wood, rangeland or water source is complete without measures aimed at supporting women's empowerment in decision-making.

To prevent participatory monitoring from becoming a very time consuming task that can easily overburden field staff and participants, and subsequently be poorly accepted, it should concentrate on those aspects of the implementation process that the stakeholders perceive as being particularly important. Building

the participants' capacity to monitor their own plans and activities is essential for making the participatory process sustainable. Progressively refining the terms of reference for collaboration may significantly contribute to creating or maintaining good relationships among partners. Participants greatly require professional follow-up to technical innovation introduced by the project in the areas of farming systems and CPR management. To be truly participatory, monitoring tools and procedures should be consistent with the local culture, in particular, with the indigenous means of learning and communication.

Participatory evaluation should focus on the participatory process itself, on the technical quality of the work performed and, when possible, on the effectiveness of the activities. Qualitative and quantitative technique can be used in participatory evaluation exercises. However, exercises requiring more complex technical skills should be kept to a minimum so that the greatest possible number of individuals can participate. Rural people have a strong capacity to make sound judgments about their work and its results. However, evaluation may be a culturally sensitive activity. Thus, special attention should be paid to establishing a synergy between participatory evaluation exercise and indigenous, informal evaluation practices. At the start of the project, staff must facilitate community-level participatory monitoring and evaluation activities. However, the responsibility for organizing and implementing such activities should be delegated to trained community members as soon as possible.

Efforts made to collect and process evaluation information are worthwhile only if the knowledge gained is applied to further planning and implementations. Field practice has shown that this can be best achieved if evaluation and replanning are incorporated into a single exercise, in which the review of past experience is followed almost immediately by the preparation of new plan for continuing, modifying or expanding the activity or broader initiative. Evaluations and replanning workshops and meetings represent a unique framework for including in the participatory process those sectors of the local community that have not participated in previous cycles of actives. Thus, evaluation and replanning

workshops and meetings are highly instrumental in decreasing the risk of exclusion of marginalized groups.

Since securing the continuity and sustainability of the participatory and integrated watershed management process requires long-term efforts, this cannot wait until the final stages of the project. In fact, relevant activities should parallel community-level fieldwork throughout the entire course of the project. Transferring to grassroots organizations the responsibility of running the participatory process within their communities is a key requisite for ensuring the sustainability of any participatory and integrated watershed management process. However, successfully transferring this responsibility also greatly depends on the existence of empowering conditions in the institutional environment.

A training programme capable of coping with the lack of local expertise in participatory development methods and natural resource management is an essential element of any project seeking to establish sustainable, participatory and integrated watershed management schemes. During the course of the project, a significant portion of staff time should be devoted to continuing education initiatives. Investments made by the project to build a team capable of promoting participatory and integrated watershed management at the local level should be secured through arrangements that would later allow this team to become part of the staff of local governments, line agencies or NGOs, with positions and responsibility consistent with their training and experience. Incentives should be found to encourage qualified staff to continue working in the locality after the end of the project. Participatory and integrated watershed management requires a wide range of technical expertise not available within any single line agency. To meet this need, there are two possible options: hiring ad hoc project staff, or mobilizing professionals from relevant line agencies and institutions. The first option leads to higher efficiency and better team integration: the second allows for easier sustainability and a wider dissemination of the project's approach among local institutions. In most practical settings, it is perhaps best to strike a balance between these two options. However, when

possible, collaborating within permanent staff from line agencies and NGOs is preferable. To this end, it is necessary to develop procedures for facilitating the delivery of these organization services to the project, including formal staff exchange agreements with local institutions, payment for local consultancies, non-monetary incentives, etc.

Project staff may need to have orientation on aspects such as the concept of watershed development and management, watershed guidelines, technical and social topics, the legal framework, institutional systems, and policy aspects. This would not only help them recognize and appreciate field level issues, but also help them make realistic evaluation of the ongoing programmes. They will also require special training on the monitoring and evaluation of watershed development programmes. The training institution should have experts on land management, legal and policy aspects of natural resource development, and social scientists.

With the object of minimizing the transaction costs, both on the part of the project-implementing agency and the resource users, the project has turned to ‘user participation’ as a way of assuring the maintenance and operational aspects of watershed development and protection. The project sustainability is argued to be closely dependent upon fostering the development of grass roots organizations with salient qualities that are embedded in their growth and their relationship with the project interventions. The user participation in project activities during implementation, and especially following completion is fostered by an increasing degree of autonomy and self-reliance of grass roots organizations, plus some form of decision making input into project activities leading to a measure of control over the management of the project. The user participation in pre-project planning such as information gathering, identification of the resources to be protected and the targeted groups to be involved, and the design of the regulations related to monitoring and enforcement has substantial bearing on the minimization of the transaction costs. Thus, it is suggested to recognize the poor villagers not only as beneficiaries of the participatory resource management, but to assign them the status of stakeholders in real practice and

provide them the opportunities to participate not only in conservation and protection phase, but equally in pre-project phase also. This will help realize the goal of minimization of transaction costs.

One of the first efforts on entry into the watershed after the farmers are motivated should be on the formation of farmers' groups. These groups should be as homogeneous as possible. A small group size not exceeding 15 families will create more vibrancy and dynamism. The farmers' groups could be built around fast cash income generating multiple activities. The selection of these activities could include a cafeteria of choices. All the funding of the activities should be directly handed over to these farmers' groups, once they are formed and trained in handling and managing the funds. All the decision-making on the activities to be taken up should also be the responsibility of the group leaders, based on the wishes of each household, who help them integrate it into village development plan on an annual basis. These organizations should also be asked to actively look at the question of incentives. This could result in savings and a more appropriate allocation of incentives. The project's first responsibility should be to facilitate the building of farmers' organizations. In fact, three to six months at the beginning of the project in a micro-watershed could be dedicated to this activity alone. The services of local reputed NGOs could be hired for building sustainable farmers' organizations. In order to improve watershed management activities a participatory monitoring and evaluation could be instituted at sub-watershed level.

It is has to be recognized that in most rural societies it would be practically impossible to ignore or bypass the traditional power structure altogether. The power base of the traditional elite may be eroding, but it still exists, and no large-scale project of watershed management can possibly be undertaken without their involvement, even if it implies agreeing to hand over portions of the community assets to the poor. It was found that targeting marginal groups would not produce positive results unless the agreement of the whole community was obtained. In the present economic and political climate it may be necessary to present a case for equality in terms of its contribution, or likely contribution, to efficiency in

resource use. Egalitarianism needs to be cast in terms of asset transfer rather than outright income transfers. While income redistribution may have no effect on productive efficiency, asset redistribution would link labour and investment with returns and income. For instance, the granting of property rights in forest resources to local communities could improve management of forest and link investment with returns. Asset redistribution can contribute to sustainable poverty reduction only if it increases the productive capacity of the poor and of the economy as a whole.

There is need to explore alternative ways of strengthening grass roots organizations for their empowerment and integrating them into participatory resource management. This should include user-led resource management and planning, implementation, funding and investment (through creation of rotating funds), participatory monitoring and evaluation to feedback corrections. This is to be done within the framework of commonly agreed organizations such as VDCs and user groups, which is respected by all participants. Clear rules and sanctions, and equal benefit-sharing mechanism are important for the organization building and sustainability. The conflict resolution mechanism should be based on dominant cultural values rather than on only legal deterrents.

It would be advantageous to include farming system-zoning exercise in the pre-project stage to identify homogenous area for project interventions. The project guidelines emphasize farming systems approach, which has so far been reflected more as an emphasis on single activity rather than as a system based approach. Traditionally, the farm household, as a unit involved in resource management integrates a number of activities. At present farmers' groups are based on single activity although the members are, in fact, involved in all aspects of household-based farm production. Thus, it is not advisable to base group formation on single activity. In this way, the farm families will devote all their efforts to single activity. The agricultural wing of the project along with VDCs should play a significant role in carrying out farming systems zoning exercise, so that different project interventions could be implemented in holistic manner.

It seems that no specific attention has been given for the integration of indigenous technology knowledge with improved modern technology into the planning process. It is an important part of farming system development approach and can often provide a base for subsequent point of entry for a planned activity. There is need to recognize the role of participatory development functionaries as well as local NGOs in identifying successful indigenous technology and to integrate them with improved technological option for resource conservation by the poor farmers in ecological fragile areas. The directly income generating activities like dairy and poultry keeping, agro-forestry, horticulture and vegetable farming should be given more importance over the construction of purely engineering structures for water harvesting and soil conservation.

There is need to modify the amount and basis of incentives being provided under various activities. The VDCs along with user groups should be involved with the project functionaries in the determination of incentives within a given framework, such as land tenancy, type of activities, and expected benefits to be generated by the activity for specific targeted groups. The incentive needs should also be determined on social group basis (for example women, landless, marginal, small and medium farmers etc.) for a given activity (for example agricultural, horticultural, forestry, livestock, alternative IGAs, etc.). The existing incentive structure may not be sufficient for the landless and marginal farmers, whereas, in case of small and medium farmers, incentives may be quite high, which can encourage an attitude of dependency. The best incentive results from the on-farm benefits generated from watershed resource management activities, which should be propagated to make the farmers self reliant rather than propagating the activities based on incentives, which encourage dependency attitude.

The development and protection of CPRs seems to be limited, which is due to the fact that land revenue department and forest department has not been integrated with the project. The land use title should be given to the farmers, so that wastelands can be converted into fruit orchards and community forest plantations. IWDP (Hills-II) should negotiate with revenue department and forest department for land use titling, so that authority to provide land use titles on the

community lands (panchayat lands, village pasture lands, as well as nearby forest lands) may reside with project itself. It seems that CPRs development and protection through fruit plantation and community forest plantations will continue to be severely limited if users have not the full rights on the land. It should be remembered that one of the most serious causes of land degradation has been skewed land tenure and the government owns most of the public lands, where they are unable to take much action to rehabilitate them. Thus, land use titling is a very important element in the participatory process, which gives the ownership of the main resource base in the hands of rural community.

Along with the project-implementing agency, it is the watershed development committee that is responsible for planning and decision-making. While it is debatable whether the village committee actually makes any contribution to decision making, it is definitely true that the women rarely contribute to this process. Unless those who make decisions and plan policies study the problems faced by women, the interests of women will be almost completely left out. It is mandatory under the various guidelines issued for watershed development, that one-third members of the watershed development committee should be women. However, this does not necessarily mean that the woman committee member is an active participant, or even that she represents the interests of the women resource-users in the community. Even when women do volunteer, and begin to attend the meetings, how successful are they in expressing their views or influencing decisions? A few influential member or well-off farmers usually dominate the committees, and women rarely get an opportunity to raise issues or voice opinions. In order to facilitate the participation of women user-groups in the decision making process, the objectives of the project implementing agency and the plans for intervention in the watershed should be made available to them from the very beginning. This could be done through the gram sabha, in which 50 percent attendance of women should be made compulsory. In addition, these plans should be discussed separately with the women in smaller groups to obtain the viewpoints of different categories of resource users.

Savings and credit activities provide an important means through which women can control their own finances. Individual savings are pooled to form group capital. This is used to provide loans to meet productive and consumptive needs. It is important that groups understand that cash floating is cash alive. This is, cash given in loans multiplies. Women themselves can control access to their funds, if they are taught simple accounting and the maintenance of ledgers. Training can also assist women to take decisions over the prioritization of loans, and can enable individual women to withstand pressure from men by claiming helplessness in the face of group ownership. Women repeatedly stress that any change in gender relations must be obtained in a manner that does not threaten the harmony of their homes or their security. To create space for women in society, sessions on gender sensitivity need to be organized for men. The approach and method adopted for awareness generation and integration should be consensual, even if at times change appears imperceptibly slow. Later, efforts need to be made to prepare the ground for the involvement of women in decision-making roles. Having obtained the support of men for women's activities during initial stage, efforts should be made to strengthen and establish more and more women's organization and self-help groups. Simple activities that bring quick results should be encouraged, such as kitchen gardens, soak pits and improved stoves to motivate women to work together and build their group confidence. Saving and credit activities particularly encourage women and also men to permit their women to participate in-group activities.

During the capacity building phase, a small fund may be used for activities that will strengthen the group. If it is used for small income generating activities, women should be encouraged to treat this as a loan and create a revolving fund of the returns. Over the period, women's groups should have developed a sense of identity, cohesiveness and competence in areas such as managing their finances. By this time too, women's groups would also have seen the benefits accruing from small activities such as kitchen gardens and improved stoves. As a group they should have acquired a measure of mutual confidence and have experienced the possibility and benefits offered by group action. This should be

further strengthened during the feasibility study. The aim is to ensure that women are involved wherever possible, in different aspects of project planning, especially with regard to land use. In this area, men should be encouraged actively to consider the women's point of view, resulting in joint decisions. After the women's needs have been identified and prioritized, a specific plan for women participation and their livelihood improvement should be developed and incorporated in feasibility study. This plan should include activities to reduce the workload of women, support child care and development, and plan for income generating activities that will be managed exclusively by the women's group. Meanwhile, emerging local women leaders should be identified and given training as village woman motivators and facilitators to conduct their own groups meetings and promote various issues and activities.

- There is need to strengthen and elaborate the processes initiated in the initial phase, and to undertake specific activities, which will strengthen women's technical and managerial capacities, their financial position, and their ability to collaborate in village decision-making processes. Those women not already in self-help groups should be motivated to form groups. More and more men's self-help groups should be encouraged, as this promotes a better use of saved income. During this phase, the activities generally consist of training and exposure visits directly or indirectly related to watershed development. Care should be taken that activities do not create additional burdens for women. They should be sequenced to gather momentum gradually, so that when the project is over, these activities provide livelihood opportunities.
- Beneficiaries' contribution will become a necessary condition to ensure that people's participation is genuine. It can also pave the way for beneficiaries to make larger contribution to the cost, reducing the financial burden on the development agencies. The principle of 'users must pay' can over a period be extended to the principle 'payment of cost should depend upon the extent of benefit'. The project-implementing agency should appreciate the purpose of participatory

approaches and see contributions as an integral part of them. This would help them to work amicable with local people to develop modalities of development interventions, and to achieve a better fit between the people's agenda and that of the project implementing agency. The contribution requirement will not then be seen as a hurdle by either the community or the agency, but rather as a means of reaching higher levels of participation.

- An improved institutional structure needs to address farmer concerns regarding collective work and their willingness to contribute to various activities and the bureaucracy's reluctance to work with farmers. The essential feature of an institutional structure that offers the bureaucracy incentives to work with farmers, improve its capability to work with farmers and takes advantage of the communities' willingness to pay for investments in land and water management may include.
    - Commitment of resource users to social organization and recognition for work with communities;
    - Training grants to private and public organizations;
    - Social organization as a precondition of support to watershed activities;
    - Transparent processes and dissemination of information;
    - Demand for commitment from the communities to contribute;
    - Implementation under the control of the community;
    - Review and evaluation which involve beneficiaries and is facilitated by external agents; and
    - Availability of further funds made subject to successful implementation of prior stages.
- Collective development of the plan jointly with social organizations or communities should be a pre-condition for making funds available for watershed development. But how do we ensure that the plans that come up for funding have been prepared through people's participation. It is

here that transparent processes are likely to be helpful in formation and the availability of funds, the purpose for which they are being made available, and the ways communities can access that information should be made widely available. In the long run, it is the communities that have to exercise this control. The NGOs which is given the responsibility of offering training should also have the responsibility of disseminating information on the project, so that the general population is better aware of what is transpiring in its own communities. The overall plans prepared by the communities, along with their commitment to contribute, can be the basis for further funding. Willingness to contribute could be one indicator of social organization having taken place. But using willingness alone could bias project financing towards better of areas and to treatments that bring more immediate benefits. Evaluation and reviews are to be conducted by those implementing the project and the members of the community, with the assistance of an external agent. Such processes would yield to be benefits. The communities have an opportunity to confirm whether the projects have been implemented the way they should, and what the impacts have been.

- There is no need for outside experts to conduct evaluations. The benefits of watershed rehabilitation are evident to everyone. Evaluations could focus on what works were done, whether they were done as they should have been, whether the whole community was involved in deciding what was to be done, and what the benefits have been, including increase in irrigation, yields, availability of fodder and so on. Outsiders who can ensure adequate participation of the community and also document the results can facilitate these evaluations. Under an improved institutional environment, the overall package would have components focusing on capability and incentive concerns. The project staffs are expected to become service providers. They will have opportunities to improve their ability to work with communities. They sell their technical expertise by taking on projects to organize communities

and to help them develop plans. Communities, on the other hand, would have opportunities to obtain funds for watershed related activities that they value. As emphasis will be placed on their contributions, watersheds with higher potential for development are likely to receive priority. A larger role would be given to members of communities in evaluating programmes by giving them access to information and other processes that make government staff and community organization more accountable to members of the communities.

- For watershed programmes to be sustainable, local institutions need to be strong and effective. Capacity building of local institutions for local management efforts will be of prime importance for achieving the stability of the institutions and the entire programme. The grass-roots organization should have sufficient knowledge and skills to deal with the organizational and technical issues, in addition to relevant managerial skills. Therefore, the training meant for grass-roots organization should deal with formation and structure of village institutions, user groups and water users associations; their roles and responsibilities; and account-keeping and financial management. There should also be technical training on the range of physical aspects of watershed development and management (soil and water conservation, water harvesting, afforestation, water-supply systems and animal husbandry) with a view to build institution that can make watershed management programmes sustainable. Professionals with a sound social perspective are needed for imparting technical training, so the training team should have sociologists, community organizers and water-resource specialists or agricultural engineers experienced in community development programmes.
- The institutions involved in training should also be invited to participate in the monitoring and review of progress in watershed development. This review team will help identify the scope for skills enhancement in relation to specific project implementation agencies, and make necessary

modifications in the content and the methodologies of the training. The capacities to be built among key actors such as user groups, watershed committees, project implementation agencies and the local government agencies like district rural development agencies, are different, and so are their training needs. In view of this, the institutional capability requirements of the training institutions and the training contents will vary with respect to the target groups.

- The project implementation agencies should have a sound understanding of the participatory issues in resource management, and skills in community organizing and participatory planning, as well as the engineering skills necessary to deal with water resource development, land management, etc. There is a need for training institutions to train project implementation agencies on aspects such as participatory planning exercises, the creation of user group organizations, training community organizations, water-resource development, forestry, livestock management, and land management. NGOs with sufficient experience in dealing with participatory issues in the field and which are proficient in development communication are considered appropriate for this training task. Laying down criteria for identifying watershed training institutions, thematic areas and training syllabus, building institutional capabilities for training, and building or setting up new training institutions in area where they are non-existent, would also be critical to spreading the watershed programme to new geographical areas. The conventional approach to promoting community organizations or people's institutions lays too much emphasis on the role of external agencies, and the strength of people's institutions is largely ignored. It is argued that strong, effective people's institutions can play a critical role in promoting participation by exchange of experiences and information through training and exposure visits.
- User groups and VDCs promoted by the project are essentially vehicles for the development of skills and competence, which will enable the

project to withdraw from its current area of operation. Once the project has withdrawn, some user groups and VDCs will continue to function around core activities and other will not. It is not the continued existence of a group or a particular structure, which is important, but what is more important is their ability to organize, when the need arise. Some groups will continue because they are essential to the management of a resource. It is especially important that these groups should be able to generate sufficient financial resources to continue and grow in the future. Once the project has withdrawn, other organizations and the agencies will take several of the functions of the project. For this to occur, wider linkages are essential between local groups and development institutions, which will ensure institutional sustainability. Among others, links are needed with credit institutions, with agencies providing development investments and with institutions of local government, particularly the panchayats. To achieve this, project promoted structures has to incorporate the concerns and leadership of the panchayats, without losing the advantages of local user control and management of CPRs.

- Apart from these, there are issues that go beyond the project implementation phase, including the sustainability of the natural resource base and the degree of equity in accessing the resource by different stakeholder groups. To address, these issues, changes will be needed in the existing legal policy and administrative arrangement with regard to access rights to forests and water. The issue of the programme sustainability also needs to be addressed, as it has strong implications for the sustainability of the resource base. The sustainability of the resource management programme will depend largely on the effectiveness of the resource management institutions that are promoted. For institutions to be effective, they need to have adequate representation of the stakeholders interests, technical capability to tackle

physical resource problems at the local level, organizational capabilities (including financial management), and mechanisms to resolve conflicts.

- The institutional reforms in irrigation water management initiated under IWDP (Hills-II), Jammu and Kashmir are both bold and innovative. It addresses the key issues pertaining to irrigation management: institutional structure, incentives, accountability, transparency, and sustainability. The institutional changes are still in progress. In the future, linkages need to be established which will make WUAs independent of project support. There is need to redefine the role of irrigation agency, which calls for suitable institutional restructuring. Ultimately, WUAs will need to be financially self-sustainable. Another weak link has been the issue of accountability. Mechanisms to ensure accountability must continue to be evolved. The roles and responsibilities of all the agencies concerned must be further defined. There is need to transfer all the operation and maintenance function to the WUAs in near future. Likewise, transparency is critical if the organizations are to progress further. To a large extent, transactions are captured in the accounting system. There is need to put in place simple and standardized procedures for accounting and finance. At the same time, there is need to form federations of WUAs, for which continued support and training are required. The president and members of the WUAs are well aware of the reform process, however, the farmers in general need to be made more aware of the institutional changes carried out in the selected sub-watershed to elicit their cooperation.
- At present, financial resources for the rehabilitation, repair and maintenance activities are being provided by project. The users did not have to spend anything from their pocket expect voluntary labour contribution. No doubt, availability of financial resources prior or during the reform is a prerequisite if reforms have to succeed. The present reform process has been funded by the government, but with the support from the World Bank. The World Bank grant was simultaneous with the

introduction of the reform and the loan money from the World Bank supports all works. The vital question is what other states should do if want to introduce reforms, but without World Bank funding. Some of the options could be:

- The government should transfer all the O&M funds from the department to the WUAs;
- The minimum rehabilitation programme should be scaled up in a phased manner, first starting with the very crucial areas and then scaling up;
- Mechanism of user fee collection should be put in place, a portion of which should go back to the WUAs for O&M. Once this cycle is in order, sustainability of the programme can be ensured; and
- Rights should be given to WUAs to raise their own money.
- Though institutional reforms have been initiated in irrigated agriculture management, it has to go a long way to claim all round success. At present, all the activities are supported by the government funds, even the sustainability becomes crucial in the long run, when the government support withdraws.
- Under IWDP (Hills-II), the policies are best geared to the improved management of enclosed VCLs, forests, grazing lands, water harvesting structures, gravity based irrigation channels, and other resource conservation and protection activities. The poor who live at the edge of subsistence necessarily place a high value on their time: if conservation of natural resources comes into conflict with meeting the immediate need for survival, then they disregard the concern for conservation. For poor to be interested in conservation, a mechanism has to be devised that incorporates it into the livelihood security of the poor. This is especially true in a differentiated society where the poor might be tempted to free ride in the hope that the non-poor would make necessary investment for conservation. Of course, the non-poor may not oblige, if increasing links with the external economy allow them alternative opportunities for investing their surplus. In that case, depletion of

resources would become inevitable. The solution is to take advantage of links with the external economy in a way that simultaneously promotes conservation and improves the livelihood security of the poor. Policy changes are imperative for better tradeoffs between environmental protection and poverty reduction. These are likely to arise, especially when access to a resource is restricted for a period. A strong policy response, which recognizes this tension and which is developed in consultation with local people, is essential to the resolution of conflicts.

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